SEPTEMBER 19, 1955

STEEL
The Metalworking Weekly

Value Analysis

Creative study of materials, parts cuts costs, says GE's L. D. Miles

— page 101

No. 8 in 1955 Management Series

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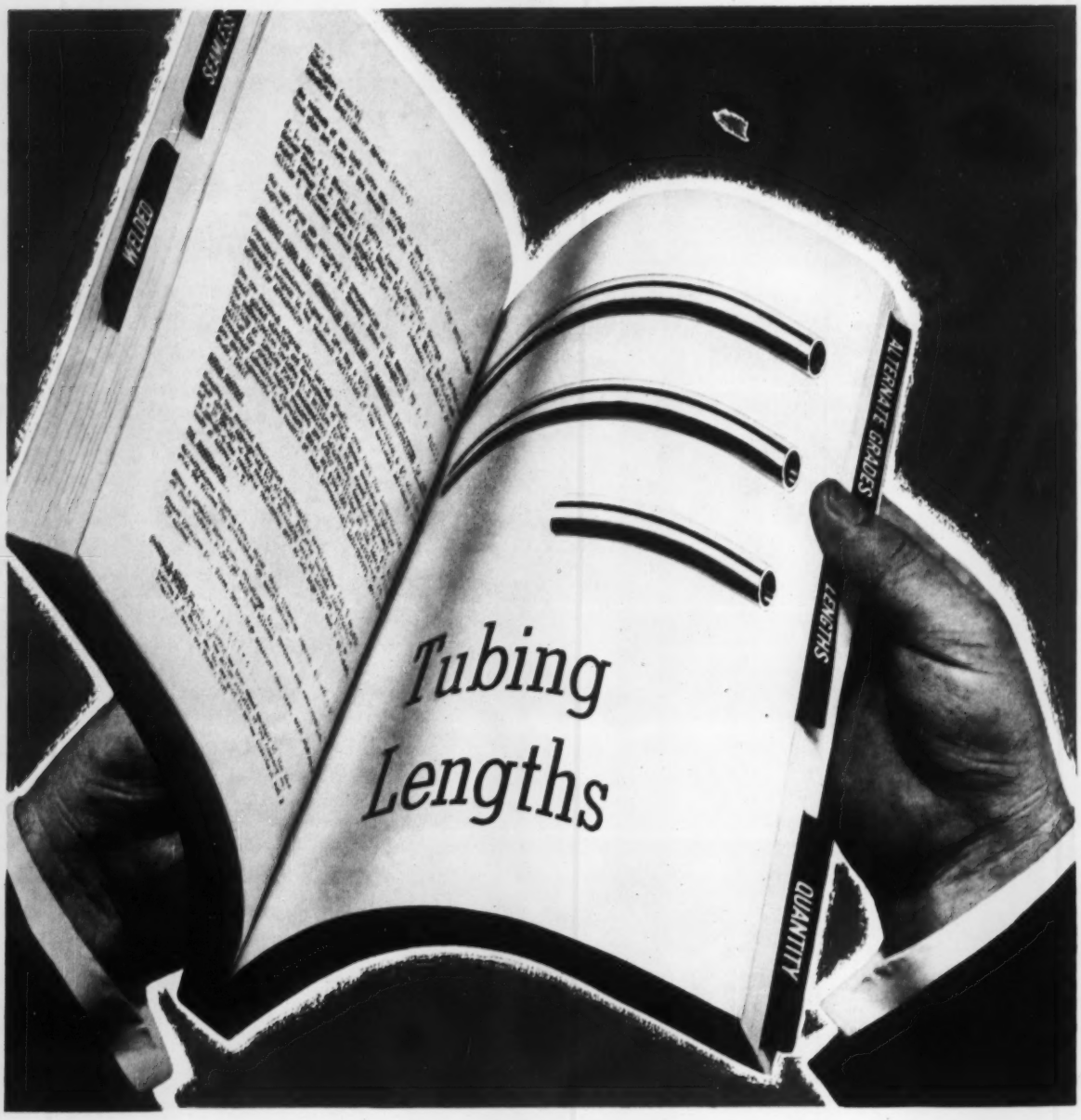


PURCHASING'S ROLE IN TUBING SELECTION

Even after a purchase requisition calling for tubing for any specific pressure or mechanical application is written, the purchasing agent must weigh many considerations.

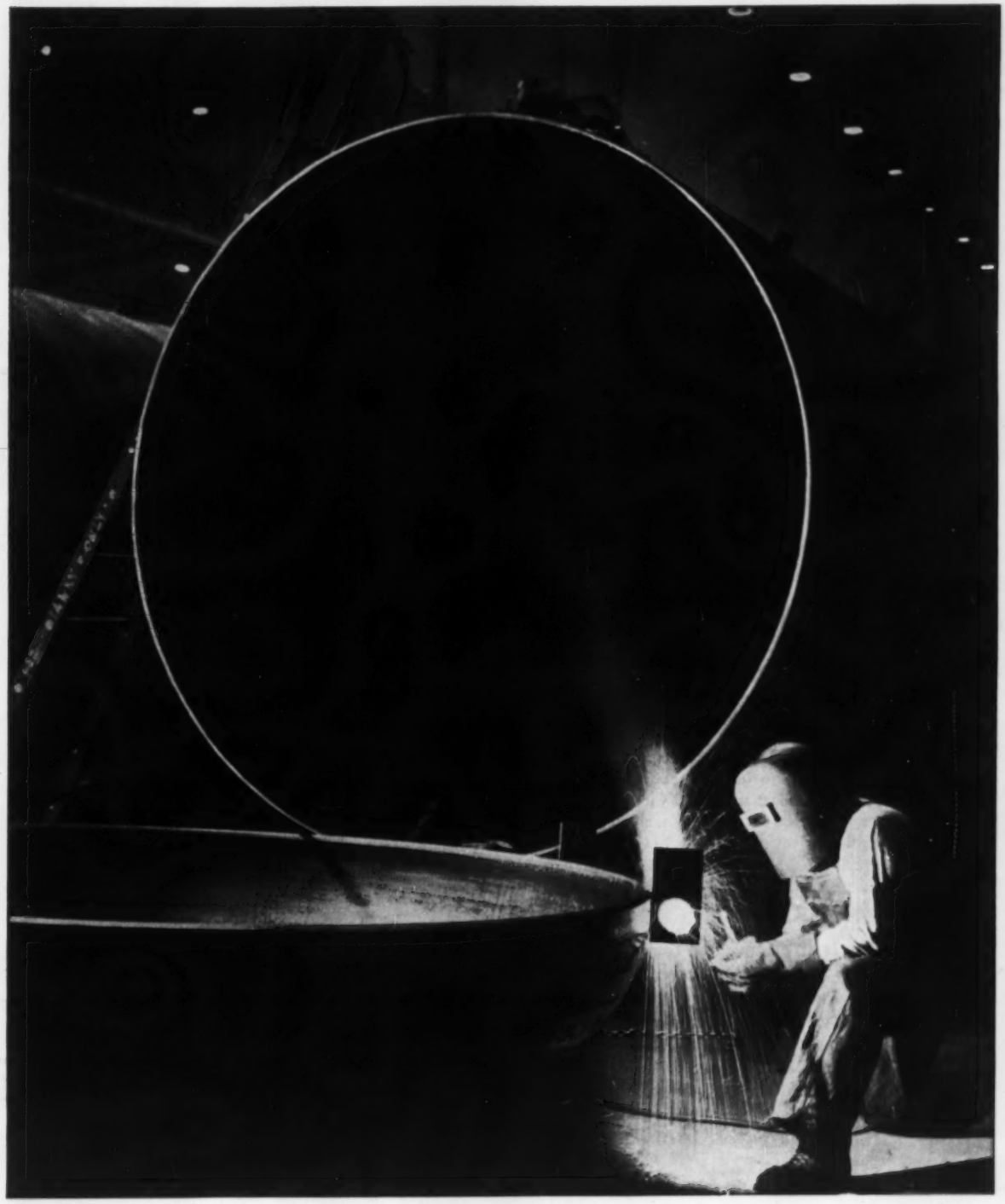
In addition to selecting a tubing manufacturer, he must determine the type of length to order (random, multiple or cut length), quantity factors, alternate choice of seamless or welded, and alternate grades. All these factors can easily influence cost and/or delivery.

More and more alert purchasing agents are adopting B&W as their principal tubing supplier because B&W, in addition to offering literally millions of combinations to meet practically every conceivable tubing need, provides through Mr. Tubes—their link to B&W—the kind of friendly service that helps them get the most for their money.

B&W
TUBULAR PRODUCTS DIVISION

(TA-5052 G)

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis. Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio Welded Carbon Steel Tubing
Milwaukee, Wis. Seamless Welding Fittings



WELDABILITY— In making tanks or pressure vessels no factor is more important than the welds. Bethlehem heads are made of uniform steel of high quality, so that with good welding practice tight, sound welds are assured. We make heads in diameters up to 144 in., and in thicknesses ranging all the way from 14 ga to 3½ in. In addition, we produce a full line of saddles, covers, fittings and flanges as well as other flange-shop specialties.

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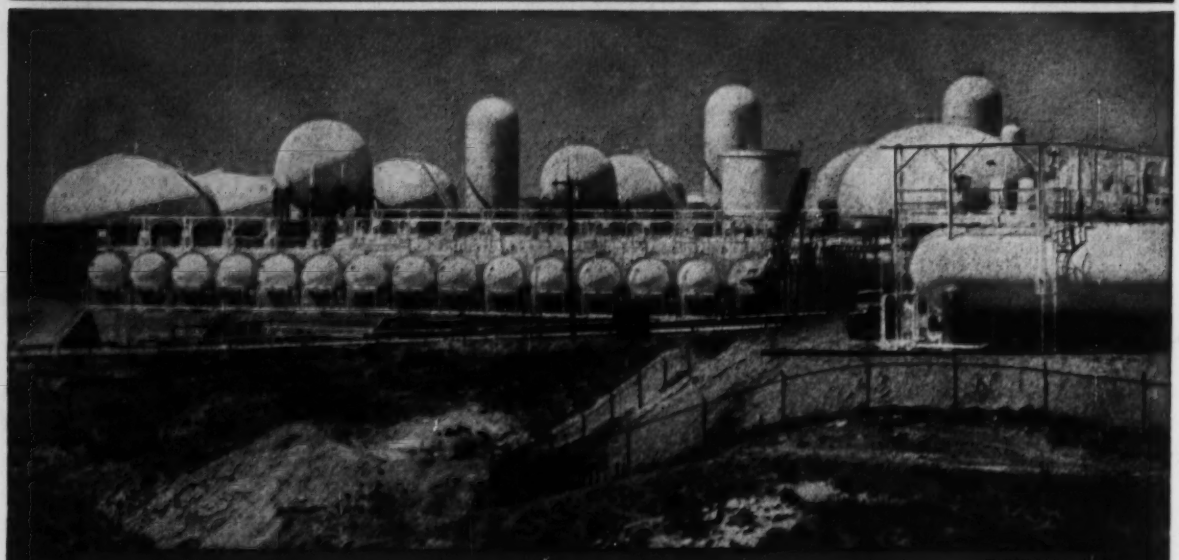
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Philgas® IS AMERICA'S LARGEST SELLING LP-GAS



RELY ON PHILLIPS PETROLEUM COMPANY FOR DEPENDABLE SUPPLY!

Phillips tremendous manufacturing, transportation and storage facilities provide dependable supplies of Philgas when and where you need it, even in periods of peak demand. The modern processing plant pictured above is one of Phillips many installations engaged in the manufacture of Philgas. Pipelines carry Philgas to strategically situated underground storage facilities. Phillips maintains its own fleets of tank cars and trucks to insure prompt deliveries.

● There is no cleaner fuel than Philgas. This quality LP-Gas is produced and processed by Phillips Petroleum Company to rigid standards of purity. It is free from harmful contaminants. You can rely on it for high thermal values, uniform gravity and pressures. In addition, the automatic features of a Philgas system keep your labor costs low.

Leading industries are using Philgas profitably for core baking, mold drying, heat treating, ceramic operations, food processing, textile finishing, space heating, metal cutting, and as a clean, economical motor fuel. Write for full information. It will pay you to find out how Philgas can cut down your operating costs . . . and how it can increase your profits.

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Phillips 66 Philgas
THE ALL-PURPOSE FUEL

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THE LOW COST "HUSKY BOY" . . . 200 amp. aircooled engine driven arc welder, that's light in weight, low in cost—designed for easy welding and use in or away from the shop.

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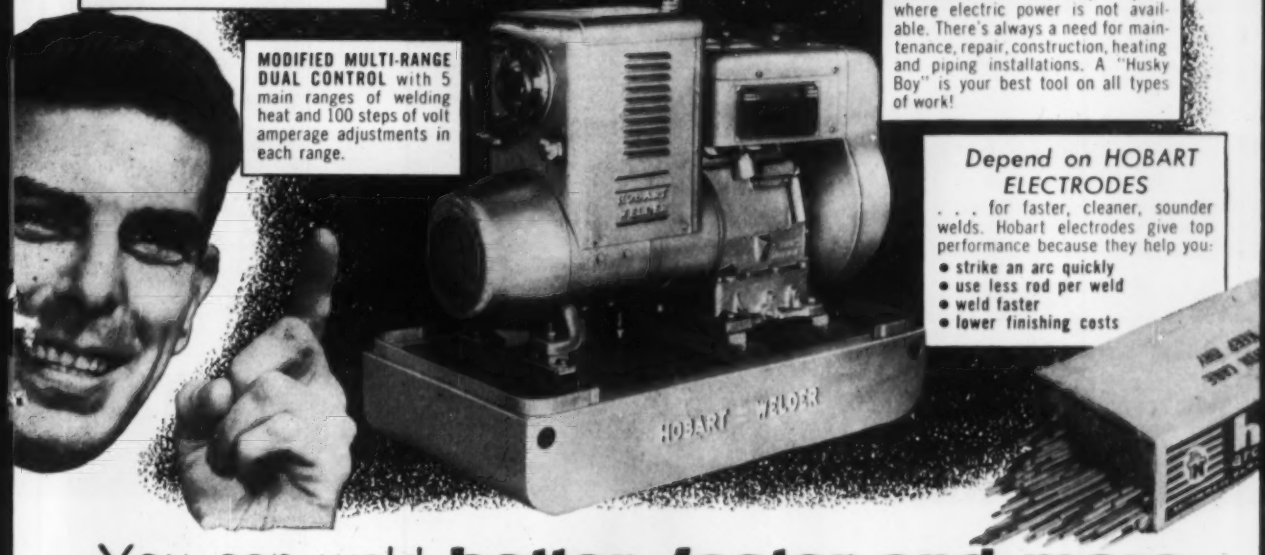
Depend on HOBART ELECTRODES

. . . for faster, cleaner, sounder welds. Hobart electrodes give top performance because they help you:

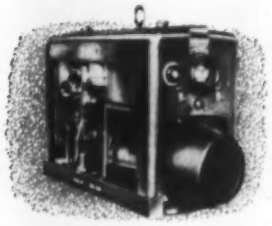
- **strike an arc quickly**
- **use less rod per weld**
- **weld faster**
- **lower finishing costs**



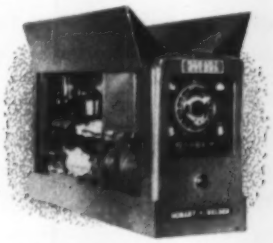
You can weld **better, faster and more profitably** with a HOBART WELDER

. . . because a Hobart Welder gives you rugged, heavy duty construction, long life, trouble-free service and extra capacity. In addition, you get famous Hobart convenience features: modified multi-range dual control and auxiliary power outlets that let you operate lights and tools.

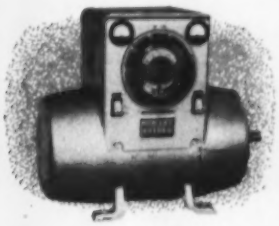
Space limits us from showing you our complete line, so simply check the type welder you're interested in, and send this page to us with your name and address. You will promptly receive complete information—without obligation, showing how you can profit when you choose a Hobart.



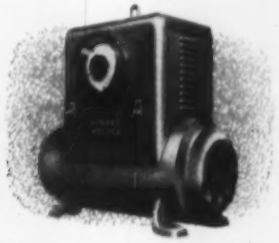
"CONTRACTORS SPECIAL"—a 250 amp. Gas Drive model that's light and compact . . . yet has plenty of engine power and a hot, fast dependable arc.



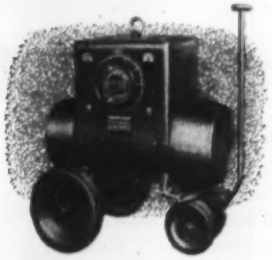
GAS DRIVE WELDERS with 1, 3, or 12 KW auxiliary power. 200 to 600 amp. models for speedy, low cost welding in the field where electric power is not available.



GENERATOR ONLY 200 or 300 amp. with 1 KW 110 volt DC power outlet for "Building-Your-Own" Gas Engine Welder. Has Hobart Multi-Range Control. Simply connect it to your power source.

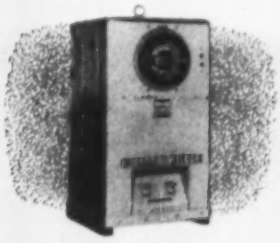


"BANTAM CHAMP" 250 amp. welder specially designed for light to medium requirements. A popular model for all fabrication purposes in the 200 to 250 amp. class.

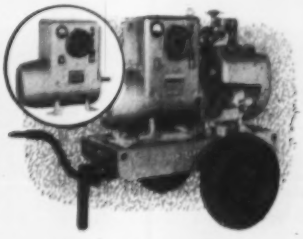


ELECTRIC DRIVE 300 and 400 amp. welders ideal for production, maintenance and repair service. Conservative rating lets you do heavy duty welding for limited periods of time.

DC RECTIFIER 300 amp. Has three Delta connected transformers, one for each phase . . . . a magnetic line switch . . . overload protection on both rectifier and transformer plus remote control.



TRANSFORMER WELDERS 180 to 500 amp. models for shops that have only single phase power available. These models are liked by operators because they start fast and hold a stable arc.



AC POWER-AC WELDER 200 or 300 amp. Popular for general service welding where power is unavailable, or for operating tools, lights, etc. Available with 2 cylinder aircooled engine and portable mountings, or as a generator only for building your own unit.

HOBART BROTHERS COMPANY

"One of the world's largest builders of arc welders and arc welding equipment"

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check the welder—tear out page and mail to

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BORING, TURNING, FACING OF LARGE PARTS - WITH THIS

Ex-Cell-O Style 425-A Vertical Precision Boring Machine

EX-CELL-O VERTICAL PRECISION BORING MACHINE

Developed by Ex-Cell-O, this standard Style 425-A Vertical Precision Boring Machine is massive and versatile. It has a heavy-duty, high-speed work spindle and rigid tool slides for close-tolerance work with a fine surface finish. It's designed for accurate production work on large parts.

The heavy cast base supports a column on which two vertical slides are mounted, each carrying a cross slide. Slides are operated by large hydraulic cylinders and move on hardened and ground steel ways. Vertical slides are fully counterweighted. All these features mean smoother operation.

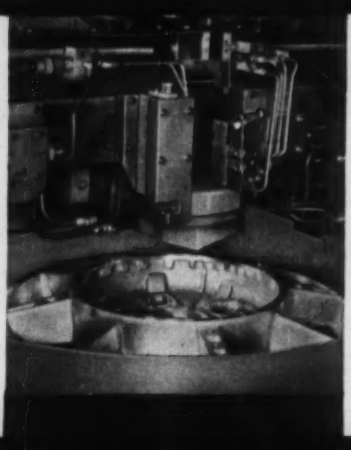
The large work spindle supports a 36-inch diameter table having T-slots for mounting fixtures. The table is driven through a precision worm at variable speeds up to 500 rpm.

The machining cycle is completely automatic, including movements of vertical and cross slides, changes in work speeds, flow of coolant, and lubrication.

For more information and complete specifications on this 425-A machine call in your Ex-Cell-O representative or contact Ex-Cell-O in Detroit today.

12 Features OF EX-CELL-O'S 425-A MACHINE:

- Massive, Rigid Construction
- Easy Loading and Unloading
- Variable Speeds to 500 RPM
- Counterweighted Slides
- Large Hydraulic Cylinders
- Hardened and Ground Ways
- Flexible Automatic Cycles
- Automatic Speed Changes
- Automatic Coolant Control
- Automatic Lubrication
- Conforms to J.I.C. Standards
- Skilled Operator Unnecessary



Close-up view of a Style 425-A equipped for operations on a jet compressor frame. Tools in the left slide face 2 surfaces, turn one diameter and chamfer one edge. The right-hand slide carries tools for feed-facing, precision boring and chamfering.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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STEEL
The Metalworking Weekly

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Save Your Time—
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Phantom view shows the strong, rigid drive for quick interchangeability of tools.

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CTW

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SEND FOR A FREE SAMPLE

of Jomacs. Describe your operations, temperature conditions, etc. We'll gladly recommend an economical Jomac Work Glove and send you a sample pair. Jomac Inc., Dept. E, Philadelphia 38, Pa.

It pays to keep Jomacs on hand

JOMAC

INDUSTRIAL WORK GLOVES

Outwear ordinary work gloves by 900%

Plants in Philadelphia, Pa., and Warsaw, Ind.

behind the scenes

Award Winner

At about 9:03 on the morning of Sept. 12, Sal Marino, circulation and promotion director of STEEL, brushed some breakfast crumbs from his $5 tie and came to attention in the main dining room of the Morrison hotel, Chicago. For a moment nothing broke the stillness of the chamber except a gentle rumble of subdued burps, welling through the esophagi of several hundred Direct Mail Advertising Association members. The association had assembled early to feed itself and to award prizes to winners in its annual direct mail contest.

Our pal Sal had been invited to attend, because STEEL's entry in Class I, "Direct Mail employed to create more effective personal sales contacts," had been judged a winner. The entry included the publication's total direct mail effort for the year 1954, directed to current and prospective advertisers and their agencies. This is the second successive year that STEEL has been awarded this distinction, but Sal was still nervous when he accepted the winner's plaque.

"How does it feel, Mr. Marino," we inquired, diligently licking the point of a freshly sharpened pencil, "to be all the time up there gettin' prizes and things, a'ready?"

The second contest over, the prize in the bag and the new contest not yet under way, Sal was in no mood to waste words; so he just mumbled "swell!" and rushed off to channel the rest of his enthusiasm into another campaign to promote your favorite metalworking weekly.

On Making Money

Over on page 62 you'll find STEEL's annual examination of executive pay and trends in compensation. The entire subject is somewhat paradoxical; it is as delicate as an elephant and as far away from the average man's thoughts as a certain well known gender. You can't walk up to an executive and ask him what he earns every week, even if everybody and his brother are simply dying to know what it amounts to.

Among early American executives the medium of exchange, wampum, was more than just a standard of value. Worn as an ornament it was his badge of wealth and position; in the hands of a chief, it was his record book. Best of all, a lot of it was a sort of a passport to the happy hunting grounds. The ordinary filthy, germ-laden money of today has no such value. Indeed, a pile of it, instead of being a passport to the happy hunting grounds, is very likely to grease the skids in quite another direction.

It turns out that money isn't the only stuff that attracts and holds an executive. Executive fringe benefits are becoming as important as those for production workers.

Keglers Start

The bowling season opened with a great crash last week, and among the millions of devotees who watched balls curving the wrong way were members of the Penton Bowling League. The Penton Publishing Co., publishers of STEEL, encourages its employees to assemble one night a week to knock down wooden pins. The exercise is calculated to limber up old joints, condition young joints and demonstrate the rewards of clean living. Mike Webster, Jim Morrissey, Mary Alice Lyman, Byron Kennel and Mary Ann Stuve, STEEL's editorial representatives, resolutely mounted an attack on the tenpins that will continue through April. Webster, the transplanted Briton, astonished himself and his associates by rolling a respectable 183 in the third game. He credits his success to a fast breaking curve, uniform pins, beautiful alleys and Admiral Nelson, who said that England expects every man to do his duty.

Fate Casts Its Spell

The cryptodivision answer was 99809 (1197708 divided by 12).

Can you do this one without pencil and paper? If A is E, and E is A, and F is T, and T is F, how do you spell FATE?

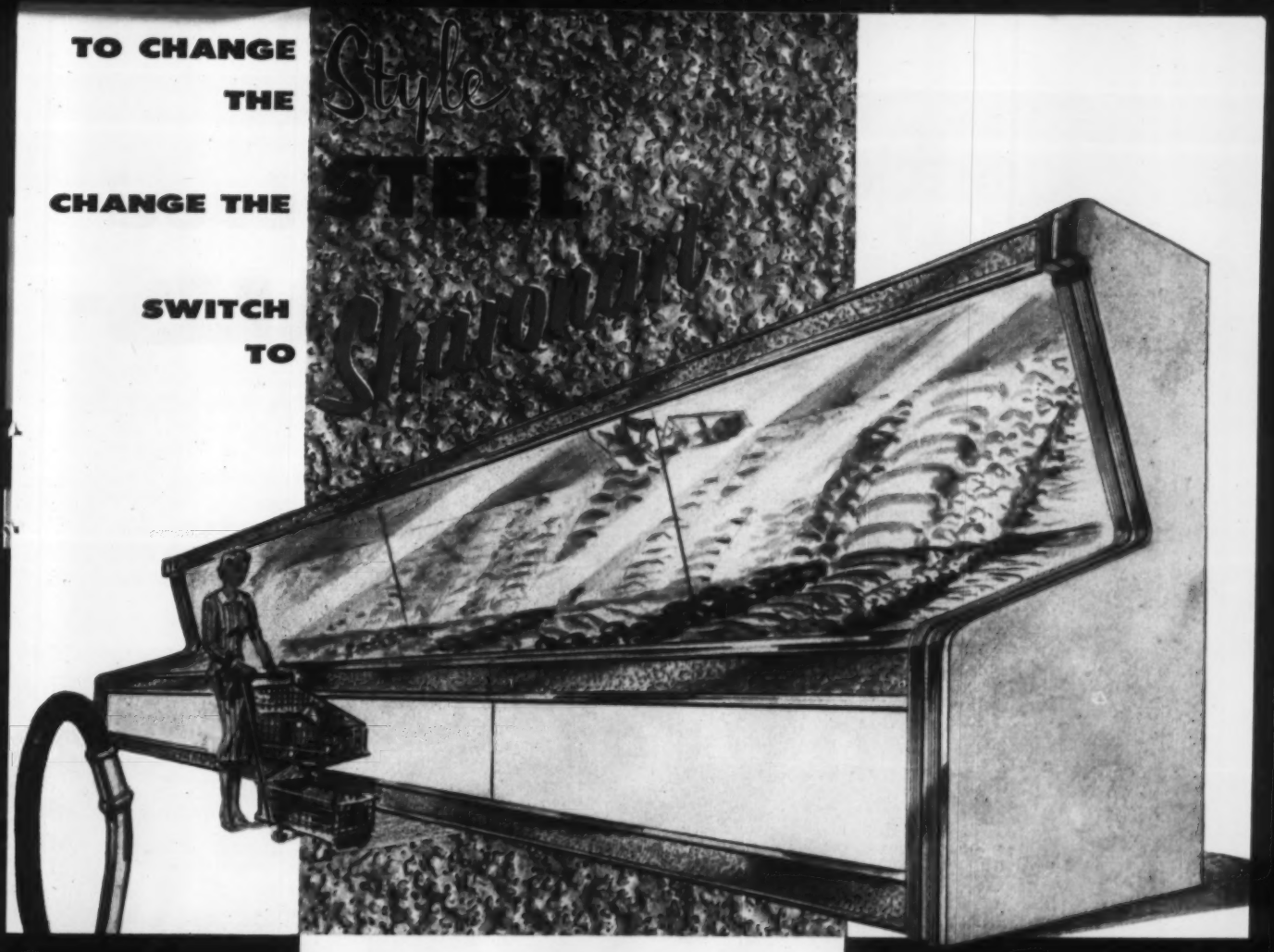
Shrdlu

(Metalworking Outlook—Page 53)

TO CHANGE THE STYLE

CHANGE THE STEEL

SWITCH TO Sharonart



SHARONSTEEL

Another quality of Sharonart—the rolled-in design steel—is its ability to resist marring. This makes it the ideal material for products that must withstand constant abuse—sweepers, display counters, business machines, metal furniture, cabinet and door hardware and so forth.

There are many other reasons why leading designers are finding more and more applications for Sharonart. What about your product? For complete information contact the Sharon office nearest you, or write direct for your copy of the new Sharonart booklet.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

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SHARON STEEL CORPORATION S-955
Sharon, Pennsylvania

Please send "SHARONART surface rolled patterns" in steel.

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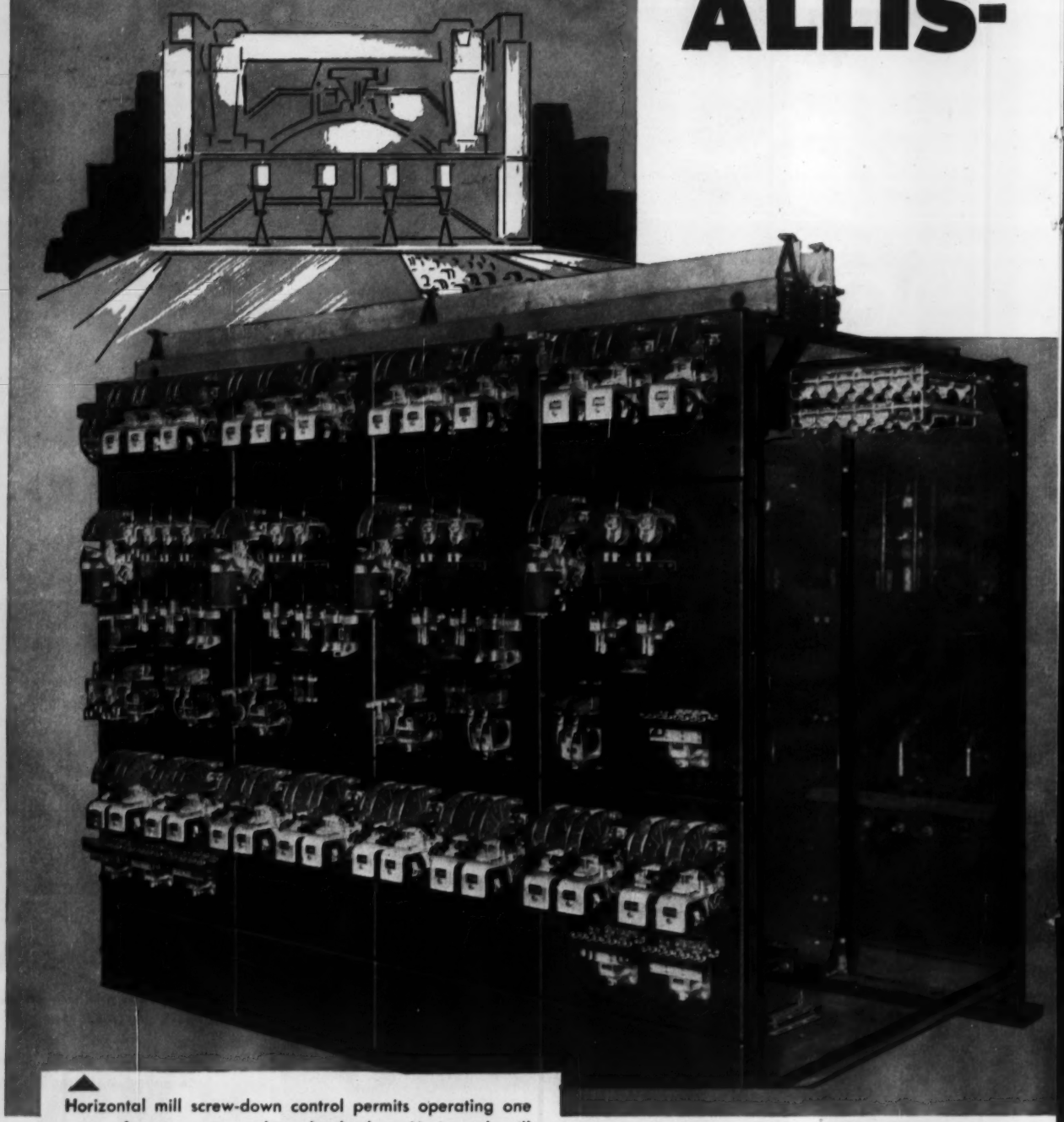
Position.....

Company.....

City..... Zone.... State.....

STEEL MILL AUXILIARY CONTROL

Engineered ALLIS-



Horizontal mill screw-down control permits operating one motor for two screws through clutches. Horizontal mill housing adjustment panel is a reversible dynamic braking controller. Vertical mill roll adjustment panels permit operating two motors in unison or individually.

ALLIS-

STEEL

and Built by CHALMERS

INSTALLED in some of the nation's largest mills, these Allis-Chalmers mill auxiliary controls are providing smooth, precision performance . . . affording maximum production with a minimum of outage time and maintenance.

When you modernize or expand, take advantage of Allis-Chalmers experience and engineering skill in building steel mill control. For further information see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

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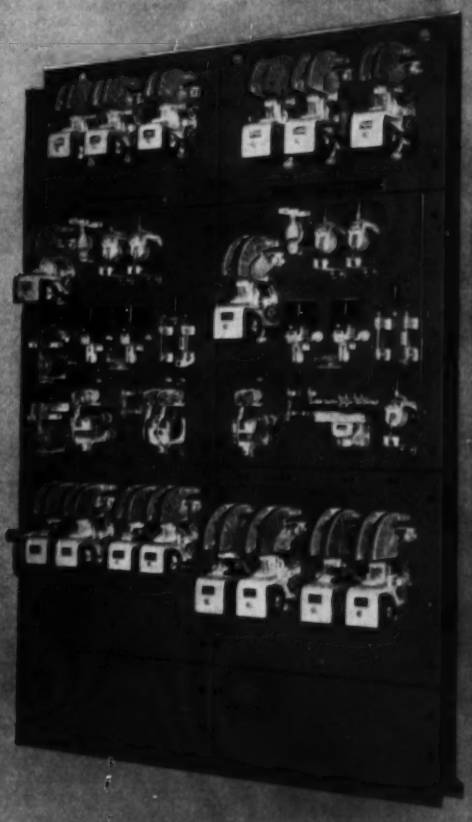
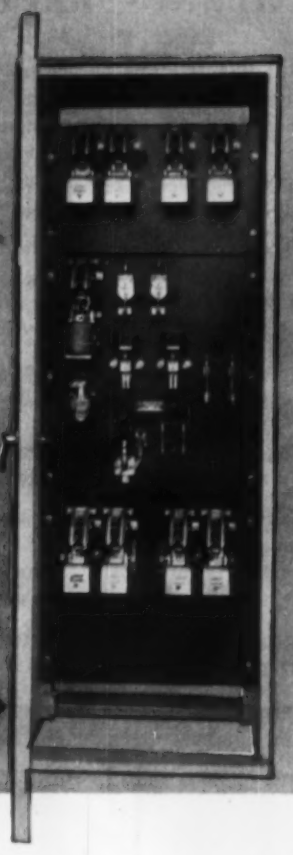


Motor control for hydraulic feed pumps. Non-reversible with field accelerating and field decelerating relays.

Two reversible controllers with dynamic braking and series brake for an upcut shear and shear pinch roll.

Reversible dynamic braking controller for roll conveyor. Operates at two speeds in either direction.



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CHALMERS

ALWAYS DEPENDABLE

When you buy Udylite barrel plating cylinders you get more than good materials—you get the experienced engineering that has made Udylite barrels the best built, longest lasting, most economical barrels on the market. For Udylite barrels are constructed with the characteristics of the materials well in mind—and engineered accordingly.

Along with fine engineering Udylite is in continuous search for materials giving longer life and greater over-all economies in barrel plating. Udylite manufactures barrels of Rubber, Bakelite, Melamine, Lucite and now in turn has developed Tempron Hard Rubber.

Tempron Hard Rubber is recommended as the best plating barrel cylinder material now available, but its characteristics require special construction. Udylite's new construction (patent pending) features interlocking panels and ribs with the added advantage that panels, ribs, rails and cylinder heads are individually replaceable.

Tempron Hard Rubber has greater abrasion resistance, will handle more cleaning and plating solutions at higher temperatures including hot Stannate Tin, and with Udylite's new construction, will take the hard pounding of heavier loads day after day.

It will pay you to investigate Tempron Hard Rubber cylinders. Fill out the coupon below and mail today.

WORLD'S LARGEST PLATING SUPPLIER

We would like to discuss Tempron Hard Rubber cylinders with your sales representative. Please have him call.

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CITY STATE

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

LETTERS
TO THE EDITORS

Weapon Against Cost Fighting

May we have 15 copies of the article, "What Cost Price Fighting?" (July 25, page 41)? We feel this subject is covered so well that the article should be brought to the attention of key personnel.

We appreciate the opportunity of seeing the facts put down so lucidly.

H. D. Krummell
Chief Engineer
Chicago Industrial Dept.
Socony-Vacuum Oil Co. Inc.
Chicago

These ideas agree with the views we have been trying to stress for some time. Please send three copies.

D. C. Handy
Manager of Pricing
Jones & Lamson Machine Co.
Springfield, Vt.

This is one of the finest analyses of the subject I have had the pleasure of seeing. I would appreciate ten copies.

George H. Hodapp
President
Dover Stamping Co.
Fall River, Mass.

We would like 12 copies to distribute to our selling force. We believe a wide distribution of this article in a personal way to individual salesmen would do much to correct the altogether too prevalent tendency toward cutting prices to secure business.

Harold F. Perry
Sales Manager
Washington Mfg. Co.
Washington, Iowa

It is an excellent article, and we believe just as important to buyers as to sellers. May we have three reprints?

G. L. Lemich
Institutional Industries Inc.
Cincinnati

• *Reprints of this article are still available.*

A 500-Bolt Work Day

The article, "Fastener with a Future" (Aug. 8, page 115) has two bolting teams installing 6000 bolts a day. Whirling dervishes could do it perhaps, but we can't claim iron workers are up to such a feat.

Two bolting crews of two men each can install more bolts than one four-man riveting team can place rivets. Average bolt installation by a two-man bolting crew in an 8-hour work day runs

(Please turn to page 12)

FIRE TRAINING SCHOOL. Here at Marinette your key plant personnel will receive special training in the proper use of every type of fire equipment. They will learn the basic techniques for fighting every kind of fire. This is the best equipped private fire training school in the nation.

There is no need to accept less than Ansul's complete fire protection program!

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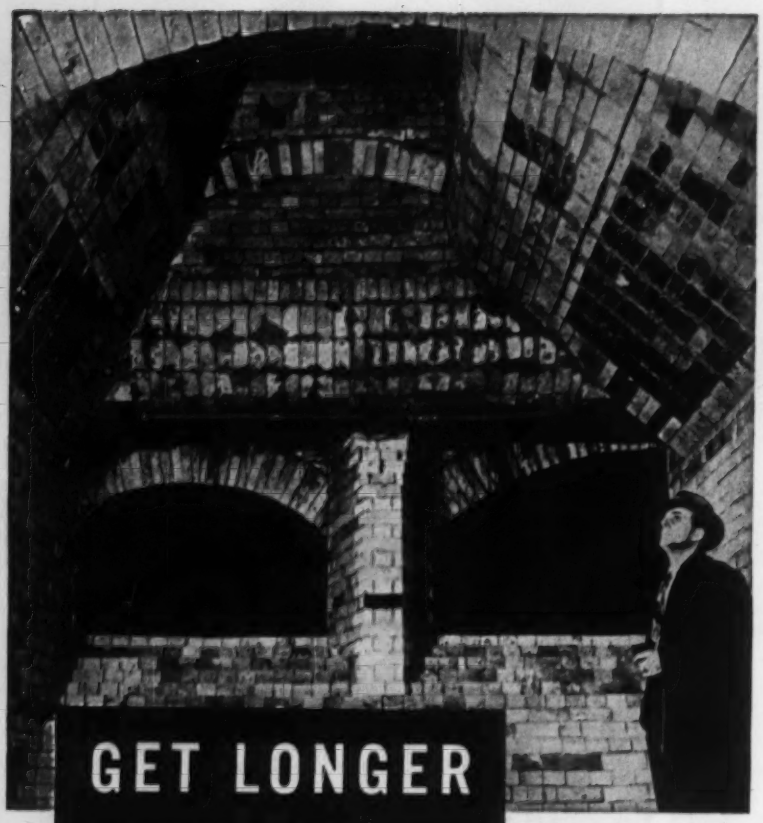
ALL ANSUL EQUIPMENT is backed by a five year warranty, your assurance of fast, effective fire protection.

Experience can be a grim teacher. It has taught many a businessman that you need a *complete* fire protection program to guard against ruinous fire damage. You need *fast, effective equipment*, plus *trained personnel* to man that equipment. Ansul offers *both* and at no extra cost. Get in touch with the Ansul man, he has the story about *complete* fire protection.

Call the Ansul Man!

Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Dept. F-132, Fire Equipment Division, Marinette, Wisc. Write Ansul for your copy of new Fire Equipment Catalog.

ANSUL



Use this 5-point LACLEDE-CHRISTY MAINTENANCE PLAN

These suggestions help you lower costs by reducing furnace down time and increasing furnace life:

1. Make an on-the-job study of your problems. Let Laclede-Christy engineers consult with your engineers in your plant.
2. Analyze your problems with Laclede-Christy mechanical, combustion and refractory engineers. You receive the benefit of Laclede-Christy experience with similar problems.
3. Get recommendations covering refractory materials best suited to your needs. Get complete instructions on proper application.
4. Make periodic check-ups with your Laclede-Christy Service Engineer. He's available on short notice.
5. Use refractories available from stock in a nearby Laclede-Christy or distributor warehouse—or direct from a Laclede plant. Shipment in most cases two or three days within receipt of order. Call or see your Laclede-Christy representative soon.

LACLEDE-CHRISTY COMPANY

HKP DIVISION OF H. K. PORTER COMPANY, INC.

2000 Hampton Avenue • St. Louis 10, Missouri

Mission 7-2400

LACLEDE-CHRISTY COMPANY Quality First

Inaugurating a new era of service to the industrial heating industry

LETTERS

(Concluded from page 10)

about 400 units, with some crews placing more than 500.

As crews become more familiar with equipment and techniques, we are confident even this rate can be increased. We also are enthusiastic over the future predicted for high strength bolts.

Robert Burdsall
Manager, Market Development and Advertising
Russell, Burdsall & Ward Bolt & Nut Co.
Port Chester, N. Y.

Technical, but Relaxing

I have just read the six-part Machining, 1955 series. May I have copies? I also would like to commend you on the quality of your magazine. As a professional engineer, I find it just technical enough to be relaxing to read, without the corollary tension required to study.

Kenneth A. Simmons
1528 Upshur St., N.W.
Washington

Vacuum Melting in U. S.

I recall a recent article in STEEL reviewed the status of vacuum melting in the United States. Unfortunately, I can not identify the issue, but I would like two copies if it can be located.

It is my impression the Germans are ahead of us in this particular development. Can you concur?

R. E. W. Harrison
Harrison Engineering Services
Washington

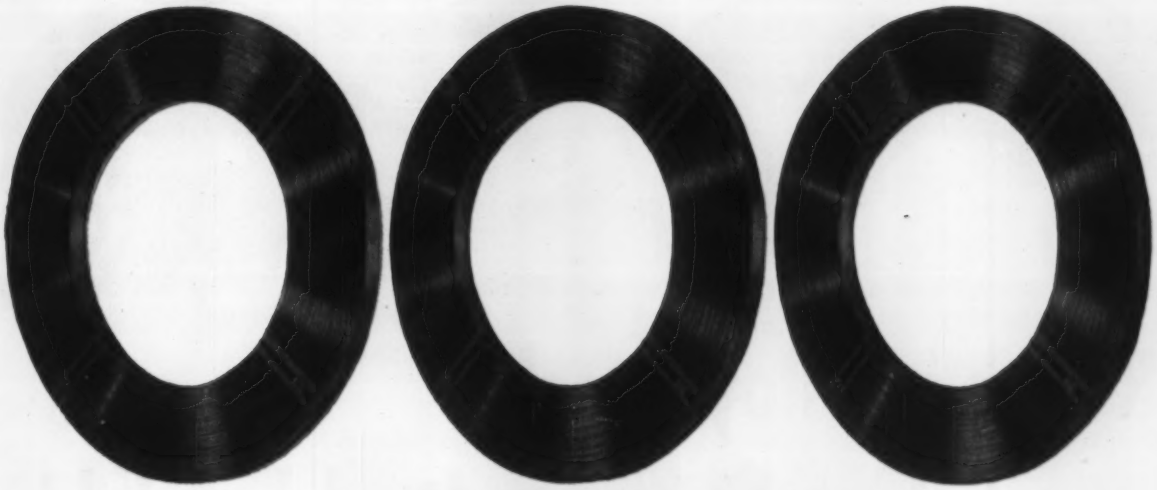
• *We are sending two copies of the article, "What Vacuum Holds for Precision Casting" (July 11, page 94). As far as large scale vacuum melting is concerned, the Germans are ahead of us. They are melting and casting up to 150 metric tons.*

Surface Agent in Bath?

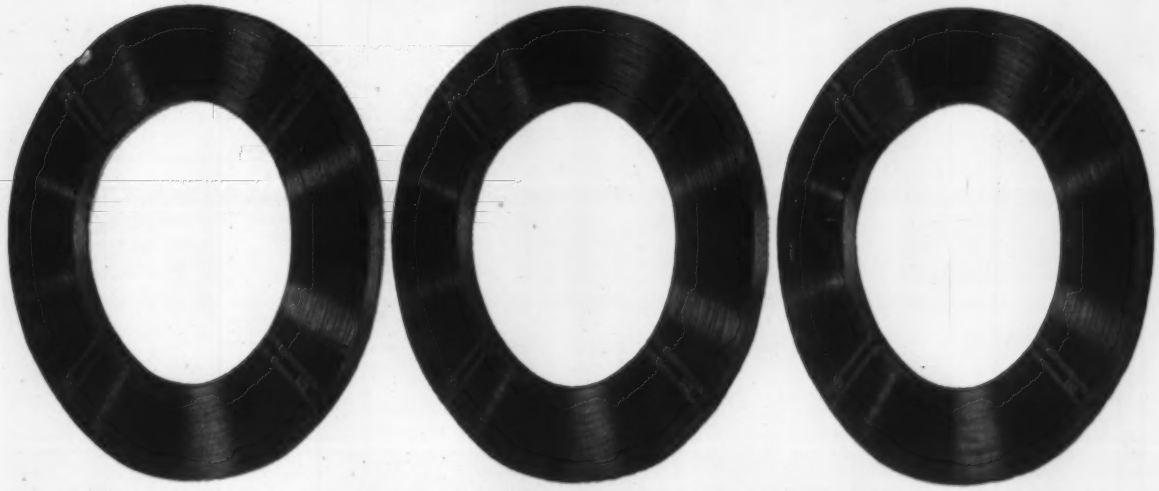
We operate a galvanizing plant and are interested in minimizing the corrosive and contaminating effects of our pickling operations. Could the surface agent discussed in your article, "A Better Place To Work" (Aug. 22, page 82), be used in a sulphuric acid pickling bath? Please direct us to the company which can supply this information.

George J. Neumann
Plant Manager
Lehigh Structural Steel Co.
Allentown, Pa.

• *Your letter was forwarded to R. C. Trees, Udylite Corp., Detroit 11, Mich.*



call CRUCIBLE for a



full range of COLD ROLLED specialty steels

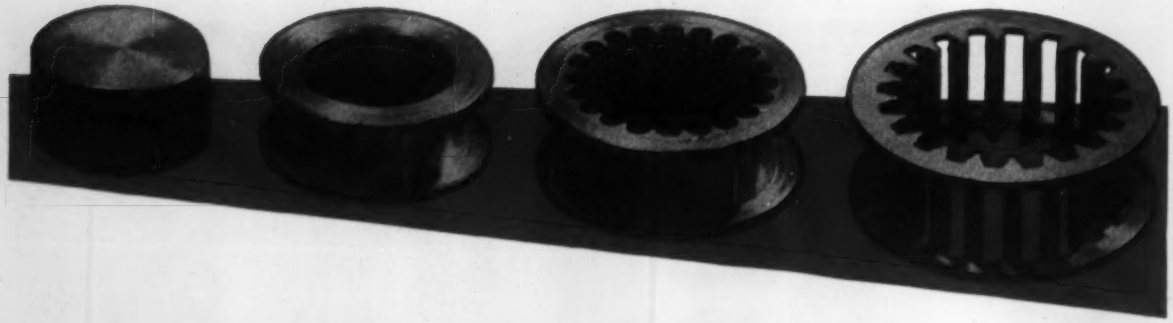
Look to Crucible for highest quality cold rolled specialty steels. You'll find a wide assortment of alloy strip and carbon spring steels . . . in many analyses, sizes, shapes and finishes.

Crucible, the nation's leading producer of *special purpose steels*, controls steel production from ore to finished product. And special Crucible-patented machines bring you cold rolled steels with *finer* finish . . . better edges . . . closer than standard tolerances.

When you have a cold rolled specialty steel application, call Crucible in during the *planning* stage. Crucible engineers can help you develop the specification . . . and knowing the end use for the steel, will prescription-make it to suit your needs—in coils or cut to your particular length requirements. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



Republic Alloy Steels help Johnson make dependable

YOU CAN SAVE ON TUBULAR PARTS LIKE THESE when Republic does the tube fabricating. Republic's Steel and Tubes Division is equipped to handle all kinds of tough fabricating jobs—has the machinery, the experience and the ability to work out the most economical method of making quality tubular parts. And that includes complete assemblies.

SAVE UP TO 66% OF YOUR STORAGE SPACE with Republic Collapsible Boxes. This PB-127 unit solves the problem of storing and shipping emtpy boxes. It's designed for heavy-duty service. Can be tiered when loaded or empty—collapsed or set up. It is a one-piece unit. Pin and slide belt arrangement assures positive locking.

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

REPUBLIC STEEL

Please send more information on:

☐ Cold Drawn Alloy Bars ☐ Boxes and Skids
☐ Mechanical Tubing ☐ Free-Machining ENDURO®

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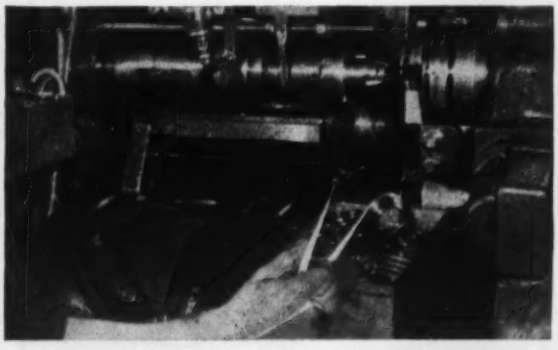
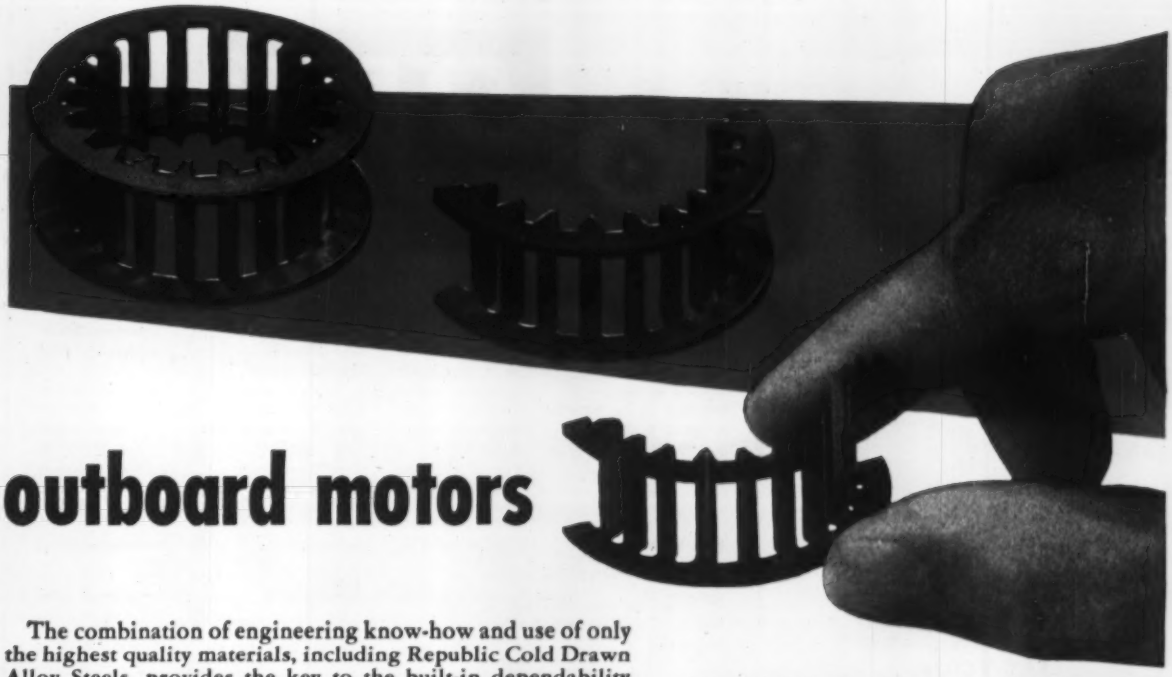


GIVE YOUR DUPLICATE PARTS THE HIGH MECHANICAL and corrosion-resisting properties of stainless steel. Do it without a heavy production penalty. Simply set up and run Free-Machining ENDURO Stainless Steel Bars. Two grades are fully 90% as machinable as Bessemer screw stock. These high-quality, cold drawn bars provide close tolerance, accuracy of section, uniform soundness, a fine surface finish. Available in hot-rolled bars as well as cold finished bars and wire.



outboard motors

The combination of engineering know-how and use of only the highest quality materials, including Republic Cold Drawn Alloy Steels, provides the key to the built-in dependability of Johnson Sea-Horse Motors.

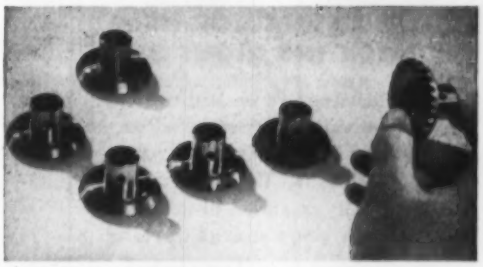
Highly machined parts, such as the connecting rod bearing retainer shown above and the spiral bevel gears that drive the propeller shaft and other parts, are made from Republic Cold Drawn Alloy Steels.

As in many new product developments, certain difficulties were encountered in the initial stages of production. The bearing retainer, considered to be one of the most difficult parts in existence to machine, is a case in point.

During rough broaching, chips welded to the broach and tearing of the metal occurred on bearing pockets. A Republic Field Service Specialist was invited to work on this problem with Johnson Engineers. A solution was worked out through close cooperation and teamwork. The blanked parts were heat-treated to increase Brinell hardness. Broaching improved immediately. Chip adherence was eliminated. Surfaces were much smoother.

Republic supplies Johnson with cold drawn alloy steel bars for better machinability, longer tool life and the fine finish needed for parts on their new line of quiet motors.

You can put these qualities of Republic Cold Drawn Alloy Bars to work in your steel parts—plus high strength, close tolerance, toughness, hardenability, accuracy of section. And Republic metallurgists and machining specialists stand ready to help you uncover the answers to tough cost and production problems, ready to help you get the most out of the Republic Cold Drawn Alloy Bars you buy. The coupon will bring you more information.



Gear action on Johnson Motors is smooth, positive, quiet. Photo illustrates sequence of machining operations performed on the spiral bevel gears that drive the propeller shaft. Republic Cold Drawn Alloy Steels give these parts added strength and a fine surface finish.

REPUBLIC STEEL

World's Widest Range

of Standard Steels and Steel Products

saw any metal fast and efficiently

with VICTOR Hand or Power Hack Saw Blades or Band Saw Blades

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announcing A NEW NEW BRITAIN +GF+ COPYING LATHE

designed for the highest production jobs in the world

THE New Britain **+GF+** Copying Lathe was originally designed as a highly versatile quickly-tooled machine, which is available in eight different models, and is an outstanding profit maker on both short and long runs.

Now New Britain has added two new models, the $11/28$ and $11/40$ which successfully apply the basic principles of this new approach to copy turning, to the highest production applications in metalworking history. One of these new machines, a typical work piece and diagrams of the operations performed, are shown on the two following pages.

If you have work that requires contour turning and facing, the New Britain **+GF+** has basic profit-making advantages. You should know about them, regardless of whether your needs call for small lots, or automated long-run production.

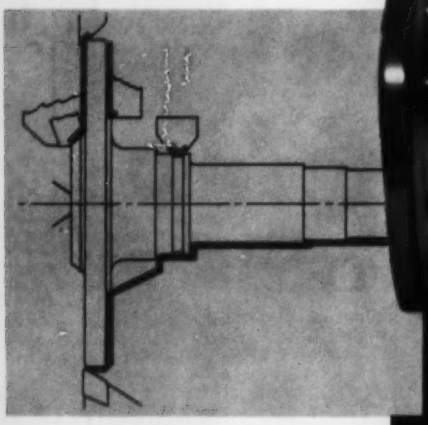
A NEW APPROACH TO COPY TURNING is the title of a new color motion picture which is available for showing in your plant. Ask your New Britain Representative, or write The New Britain Machine Company, New Britain, Connecticut.

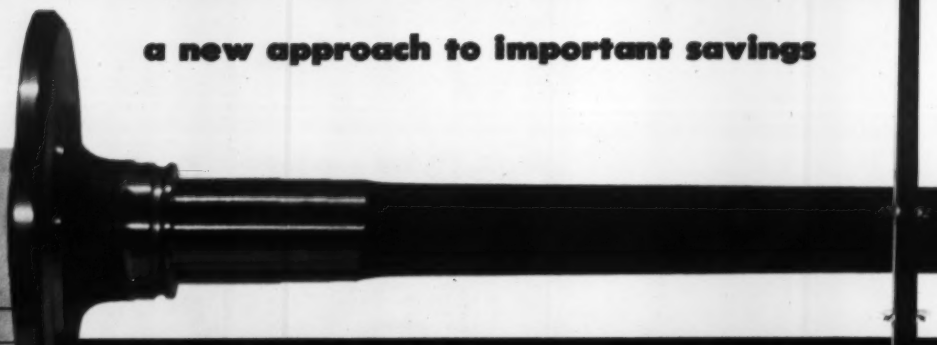
(See the following two pages for more details)

New High-production New Britain +GF+

. . . continued from preceding page

a new approach to important savings





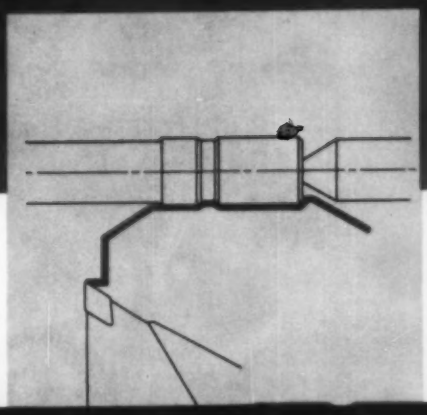
FOR the typical rear axle shaft illustrated, a double carriage design plus infeed attachment permits machining both ends at once, eliminating wasteful idle time.

This new copying lathe features pick-off change gear headstock, combined with a selector lever for high and low spindle speed range. Its basic advantages of template control, easy chip removal and elimination of expensive form tools are readily adaptable to a wide variety of work which ordinarily would require many more tools, and, in some cases, further operations on additional machines. Get the facts from your New Britain Sales Representative or write the factory.

The NEW BRITAIN MACHINE COMPANY

Copying Lathe . . .

on your "expensive" pieces



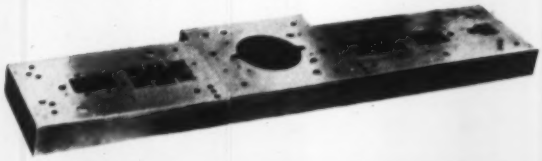
New Britain-Gridley Machine Division, New Britain, Connecticut • Jones Machine Division, Cleveland 5, Ohio

• AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES

• LINCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES • NEW BRITAIN • NEW COPYING LATHES

How to Know BEFORE DELIVERY

What Results You'll Get from the TOOL AND DIE STEELS You Order



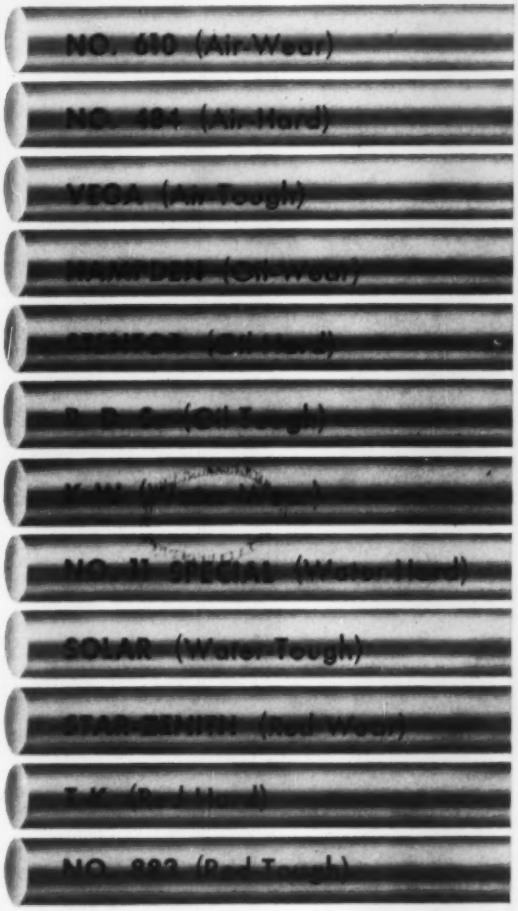
Maximum performance from your tools and dies is possible *only* when your design, toolmaking and heat treating are backed by sound, top quality tool and die steels. You control the first *three factors*. But how can you be sure, *before delivery*, that the die steels you order will deliver the *results* you want?

To give you this assurance, Carpenter puts its "mark" on *every* grade of die steel it produces. This mark, or brand name, is the sign of *consistent Carpenter quality*.

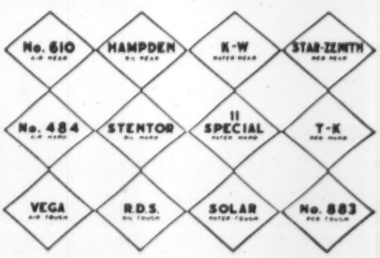
In back of it, at Carpenter, is a long list of painstaking controls. These include Hot Acid Etch Inspection, Ultrasonic Testing, Tough Timbre and Hardenability Testing. And that's only the start of many *extras* you get with Carpenter brands of tool and die steels . . . extras that enable you to predict *in advance* results you'll get on the job!

Accurate selection is one example. With the Carpenter-pioneered Matched Set Method your men take the guesswork from choosing the one steel best suited to the job. *Trouble-free heat treating* is another. Through tests and controls, Carpenter has simplified the heat treatment of Matched Tool and Die Steels beyond anything previously known. Further, a wealth of printed information gives you a "blueprint" to minimize costly heat treating hazards.

All this . . . and more, stands behind every bar of Carpenter Matched Tool and Die Steel. So, when you see any of these Carpenter brand names, you can feel *safe* in the knowledge you're getting *full value* from your investment. Specify Carpenter Matched Tool and Die Steels. It costs you no more to be *sure!*



And each bar is colored *full length* with a distinctive color for each grade. Here's *positive* identification!



Carpenter STEEL — Matched Tool and Die Steels

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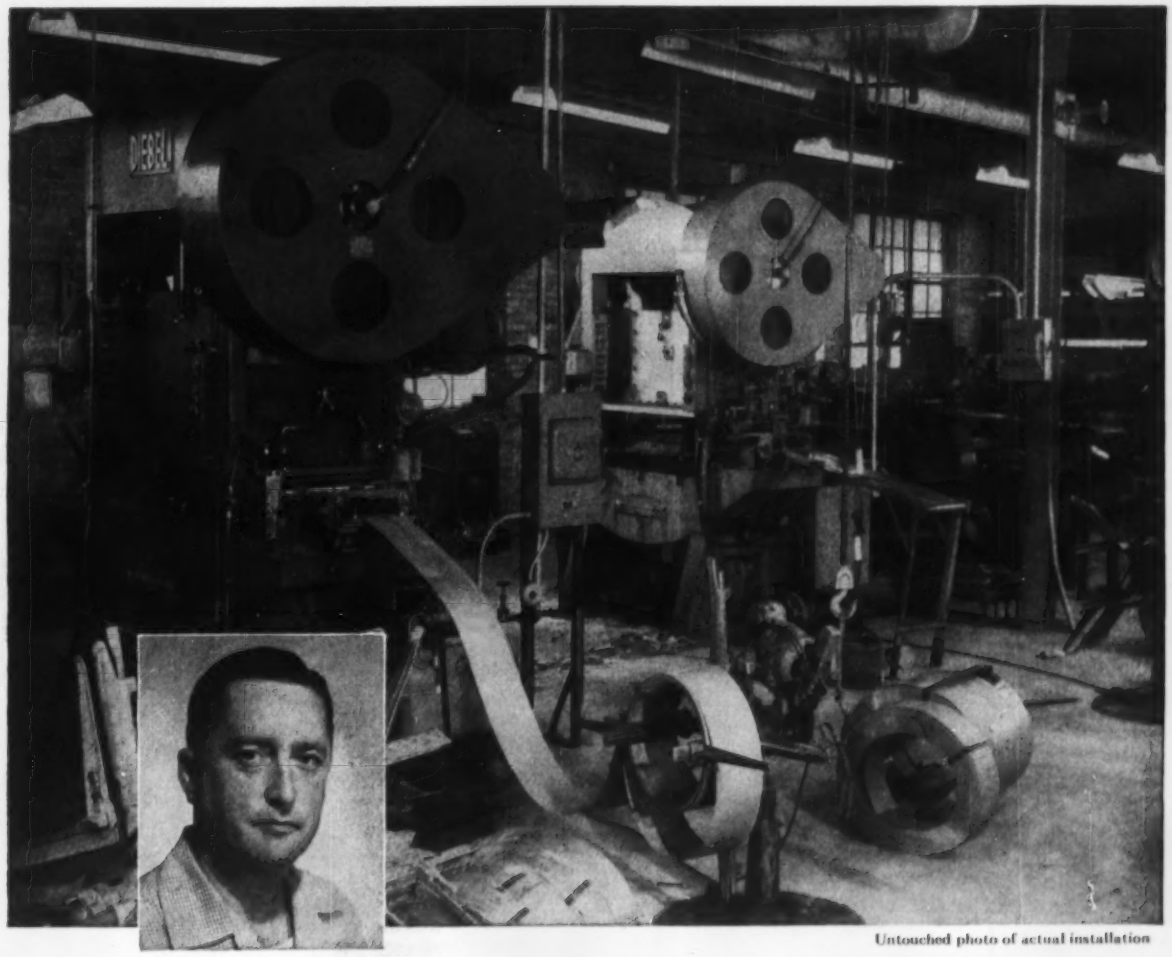


Untouched photo of actual installation

Sola Electric Gets Extra Day's Work Every Week with DIEBEL AUTOMATIC PRESS!

You need simply observe Sola Electric Company's progressive press room re-equipment program to see why they are a leading manufacturer of constant voltage transformers and fluorescent ballasts! Doing it faster, better, more economically . . . doing it automatically is the by-word at Sola!

As Max Haussler, in charge of tool making and metal working operations, explains it, "Our first installation of the program was a Diebel 60 Ton Automatic Press for stamping laminations. We soon discovered that the Diebel Press was giving us a 30% reduction in labor costs of producing laminations."

"In addition, we increased production between grinds by 30% and *die chipping was virtually eliminated!* Then too, down time and set-up time has been cut in half and maintenance costs are next to nothing! As our records show, we are getting an extra day's production every week over the former operation . . . thanks to the Diebel Press!"

In these times, can *YOU* afford anything short of a fully automatic press room? Diebel Presses are compact, self-contained, fully automatic *factories* in themselves, delivered completely equipped and ready to work for you . . . even the die if you choose!

Remember, the men at Diebel are automatic press specialists, ready and willing to help you with your stamping problems. A Press Plans Board and Engineering Staff are at your disposal. Next time, consult with Diebel first . . . and get *automatic* profits!

DIEBEL HI-PRODUCTION AUTOMATIC PRESSES

A COMPLETE LINE FROM 5 TO 100 TONS

BUILT BY DI MACHINE CORPORATION, 2710 WEST IRVING PARK, CHICAGO 18

STANDARD

STANDARD OIL COMPANY
(Indiana)

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off *for them.*

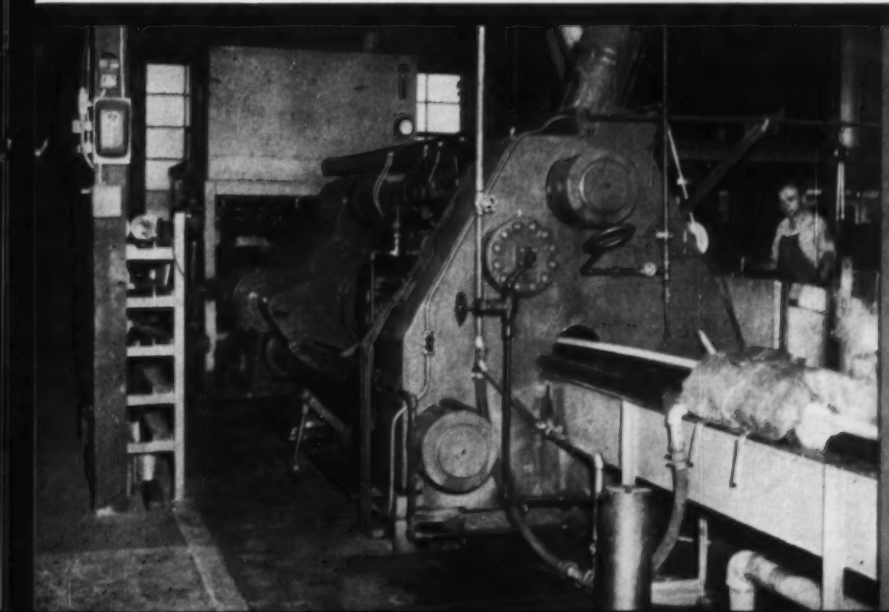
STANOIL *Industrial Oil does heavy chores for Light Metals Corporation*

Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydropress into operation. The initial fill for the hydraulic system was STANOIL Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was STANOIL ordered by Light Metals for their Hydropress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydropress, STANOIL has a perfect performance record. The Watson-Stillman press has operated seven years without a shutdown because of hydraulic fluid failure.

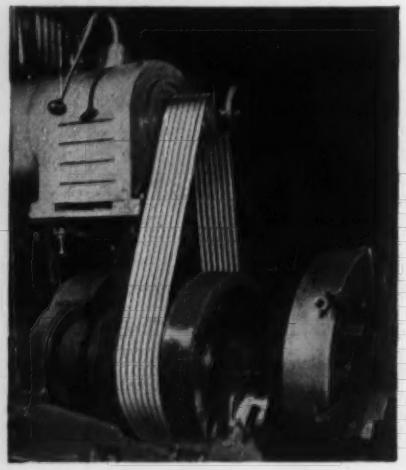
This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year—and production was increased 25% after the V-belt drive was installed.



concave sides lengthen V-belt life ...cut costs

Hundreds of plants that keep track of V-belt drive costs know this: Gates Vulco Ropes . . . the V-belts with *concave sides*... wear much longer and *cost less per year of service.*

Here is the interesting reason why:

When a Gates V-belt bends around the sheave, the *precisely-engineered* concave sides (Fig. 1) fill out and become straight. Thus the sides of the belt make full, uniform contact with the pulley (Fig 1-A).

Naturally, uniform contact distributes the wear *evenly.* And *even* wear means *longer* wear.

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

Simple test proves value of concave sides

Take a straight-sided V-belt (Fig. 2) and bend it. Feel the sidewalls of the belt bulge out as the belt bends. You see immediately that the bulging sides prevent uniform contact with the pulley (Fig. 2-A). Uneven contact causes faster wear...increases your drive replacement costs.

Let the cost-saving longer life of Gates Vulco Ropes contribute to *your* profits. Specify Gates Vulco Ropes—the V-belts with concave sides (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-54A

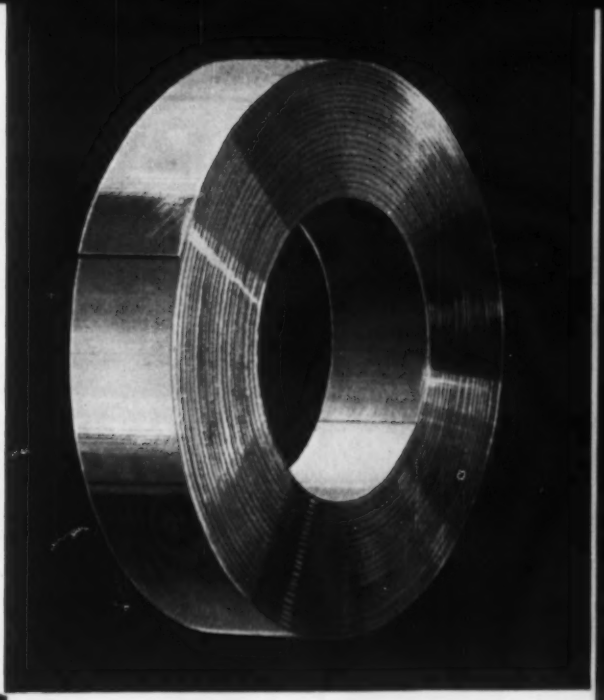
GATES VULCO ROPE DRIVES

WEIRTON

COLD-ROLLED STRIP STEEL

Also available —

HIGH-CARBON STRIP, N-A-X HIGH-TENSILE STRIP



Sentries of Quality

Weirton mills are blanketed with "sentry stations." From these outposts, the quality and uniformity of Weirton steel is guarded and guided by constant control.

From stations located throughout the mills, samples of materials are periodically carried to the Quality Control Laboratory by special pneumatic tubes. Here, complex analysis, checks and tests are made simultaneously by chemists, metallurgists and engineers, who use the most up-to-date equipment. Based on their findings, directions are flashed by telautograph and two-way radio to the men on the job.

This network of fast-acting controls is one more way Weirton maintains strict high quality and uniformity of its cold-rolled strip steel, along with the many other types of steel it makes. It is one more important reason why you should call Weirton the next time your plans call for cold-rolled strip steel.

WEIRTON STEEL COMPANY

Weirton, West Virginia

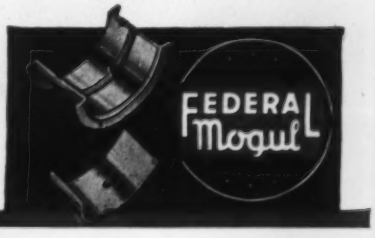
NATIONAL STEEL CORPORATION

A Control Factor in Performance!

RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

Good weather and freedom from mechanical failure used to be the farmer's harvest prayer. Today, weather is his only gamble and even that is reduced by highly dependable, fast-working machines—operating around the clock if need be. An important contribution to this mechanical dependability comes from precision-made sleeve bearings and bushings. They protect the crankshaft, maintain internal lubrication, absorb piston thrust loads, endure extreme heat, dust and long hours of steady work. Quality in their manufacture shows up in dependable field operation. We are specialists in quality bearings and bushings for engine, transmission and chassis applications—and a major supplier to the farm tractor and implement-building industry. Federal-Mogul Corporation, Detroit 13, Michigan.

SINCE 1899



FEDERAL-MOGUL

CALENDAR
OF MEETINGS

Sept. 20, Cutting Tool Manufacturers Association: Fall meeting, Lochmoor club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Sept. 20-22, Society of Industrial Packaging & Materials Handling Engineers: Annual exhibit, Kingsbridge Armory, New York. Society's address: 111 W. Jackson Blvd., Chicago 4, Ill. Managing director: C. J. Carney Jr.

Sept. 22-23, Industrial Distribution Forum: National meeting, Sheraton-Gibson hotel, Cincinnati. Sponsor: Triple Industrial Supply Group, 2130 Keith Bldg., Cleveland 15, O.

Sept. 22-24, Automotive Parts Rebuilders Association: Annual meeting and exhibit, Hotel Fort Shelby, Detroit. Association's address: 220 S. State St., Chicago 4, Ill. Secretary: Jack O'Sullivan.

Sept. 23, Malleable Founders' Society: Fall meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Secretary: L. D. Ryan.

Sept. 25-28, American Institute of Chemical Engineers: Fall meeting, Lake Placid club, Lake Placid, N. Y. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 25-29, American Society of Sanitary Engineering: Annual meeting, Vancouver hotel, Vancouver, B. C., Canada. Society's address: 4716 Ewing Ave. S., Minneapolis, Minn. Secretary: Walter A. Dunn.

Sept. 26-27, Radio-Electronics-Television Manufacturers Association: Symposium on automation, Irvine Auditorium, University of Pennsylvania, Philadelphia. Association's address: 777 14th St., N. W., Washington 5, D. C. Secretary: James D. Secrest.

Sept. 26-28, American Management Association: Personnel conference, Hotel Statler, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice President: James O. Rice.

Sept. 26-29, Association of Iron & Steel Engineers: Annual convention, Sherman hotel, Chicago. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 26-30, Atomic Industrial Forum Inc.: Trade fair of the atomic industry, Sheraton-Park hotel, Washington. Forum's address: 260 Madison Ave., New York 16, N. Y. Executive manager: Charles Robbins.

Sept. 28-30, National Association of Foremen: Annual meeting, Texas hotel, Ft. Worth, Tex. Association's address: 321 W. First St., Dayton 2, O. Secretary: Jean B. Adams.

Sept. 29-30, American Hot Dip Galvanizers Association: Semiannual meeting, Sheraton-Belveder hotel, Baltimore. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 29-30, Refractories Institute: Fall meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: A. C. Newton.

Sept. 29-Oct. 1, American Ceramic Society Inc.: Materials and equipment—white wares divisions joint meeting, Bedford Springs hotel, Bedford, Pa. Society's address: 4055 N. High St., Columbus 2, O. General secretary: Charles S. Pearce.

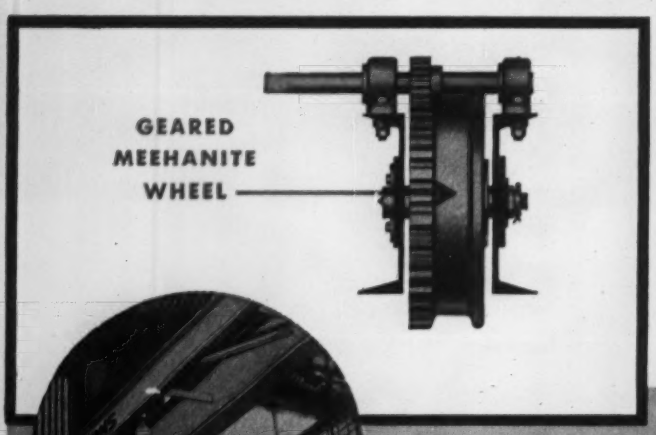
Oct. 3-5, National Electronics Conference Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Conference address: 84 E. Randolph St., Chicago 1, Ill. Executive secretary: John S. Powers.

Oct. 3-7, American Institute of Electrical Engineers: Fall general meeting, Hotel Morrison, Chicago. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Oct. 6-7, National Foundry Association: Annual meeting, Edgewater Beach hotel, Chicago. Association's address: 53 W. Jackson Blvd., Chicago, Ill. Secretary: Charles T. Sheehan.

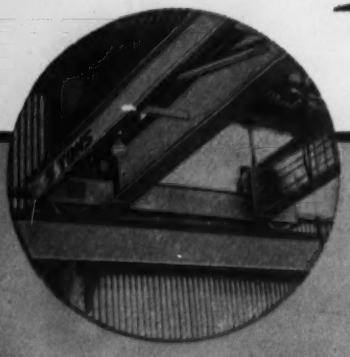
The MEEHANITE® Casting Reporter

CRANE MANUFACTURER REPLACES CAST IRON WHEELS WITH MEEHANITE METAL®



One of the leading manufacturers of overhead traveling cranes, crane runways, hoists, and trolleys, Lypta, Incorporated, Houston, Texas, has standardized on specifying Meehanite metal for all the crane and hoist traveling wheels it manufactures.

In the search for better performance, the company found Meehanite cast and machined wheels to be better than those of cast iron or "car wheel iron" from the standpoint of strength, and better than steel because wheels made of Meehanite metal running on steel rails do not cause the noise made from the contact of steel wheels on steel rails.



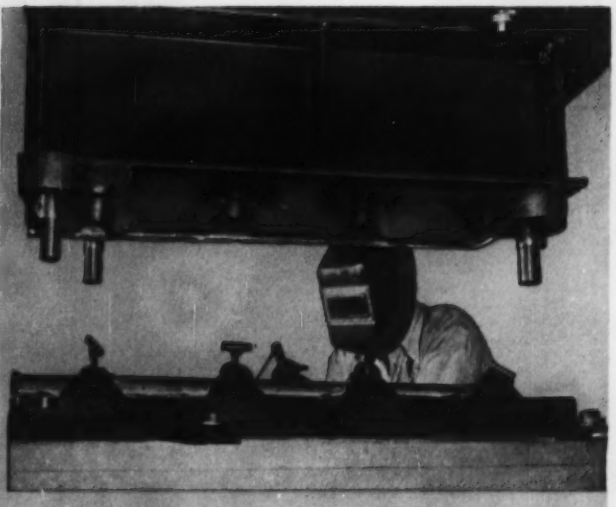
THE MANUFACTURER SAYS:

"We have found that by using Meehanite metal for the traveling wheels on our cranes and trolleys, that we can furnish a wheel which will withstand seven times the impact of ordinary cast iron and has approximately the same tensile strength as steel. Meehanite castings machine better; do not wear the rails as fast because of their graphite content; and lend themselves readily to heat treatment and flame hardening."

CLAMPING PRESS USING MEEHANITE DIES MEETS EXACTING REQUIREMENTS

One of the operations involved in the making of exhaust systems for the Pratt & Whitney Aircraft Wasp Major engine at the plant of the Ryan Aeronautical Company, San Diego, California, is spot-tacking two large stainless steel half-stampings together with an arc welder. Savings in scrap loss, time and money were achieved by building special clamping presses which incorporated Meehanite dies.

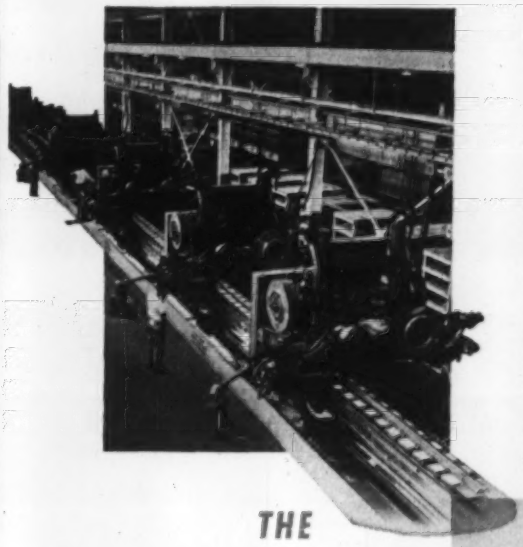
As shown here, the welder using this clamping press inserts an arbor in the half-stampings, then brings the Meehanite dies down within contact thus being assured of an exact, close-fitting connection between the two half-stampings. The welder then arc-tacks the half-stampings together at the flange area.



THE MANUFACTURER SAYS:

"Meehanite metal was selected as the die material because it best meets the specific requirements for this work. Because the arc-tacking is performed very close to the dies, the localized application of heat would melt the lead or Kirksite alloys which are often used in such applications. Meehanite dies do *not* melt nor distort from the application of this localized heating, and are therefore excellent for these exacting requirements. Also, it is substantially more economical to use Meehanite dies rather than steel."

Industries report what Meehanite Castings have done for them



FARNHAM "LONG MILL" REQUIRES 64 TONS OF MEEHANITE CASTINGS

The development of the Long Mill by the Farnham Manufacturing Division of the Wiesner-Rapp Co., Inc., Buffalo, New York, has revolutionized the milling of spar caps for the Navy planes at the Torrance Facility, El Segundo Division of Douglas Aircraft Co., Inc.

This mill, the largest of its kind in the world, is 308 ft. long and has eight integrated carriages which operate individually on the bed.

The sub-base or work-holder unit which is mounted on the basic bed was designed and fabricated in the Torrance plant. It is 288 ft. long and composed of 72 four-foot long Meehanite castings weighing a total of 64 tons.

After assembly on the machine bed, the 18-in. wide surface of the work-holder unit was machined to insure parallelism with the warp of the machine.

THE MANUFACTURER SAYS:

"Meehanite castings were specified for this Farnham Long Mill because the requirements called for castings of high tensile, non-deforming metal that had good machining characteristics and that would withstand shock loads without surface marring."

ONLY A MEEHANITE FOUNDRY CAN MAKE MEEHANITE CASTINGS

The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, New Jersey
Blackmer Pump Company	Grand Rapids, Michigan
Compton Foundry	Compton, Calif.
Continental Gin Co.	Birmingham, Alabama
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio & Grove City, Pa.
Crawford & Doherty Foundry Co.	Portland, Oregon
DeLaval Steam Turbine Co.	Trenton, New Jersey
M. H. Detrick Co.	Newark, N. J. and Peoria, Ill.
Empire Pattern & Foundry Co.	Tulsa, Oklahoma
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Georgia Iron Works Co.	Augusta, Ga.
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Hardinge Company, Inc.	New York, New York
Hardinge Manufacturing Co.	York, Pennsylvania
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Koehring Co.	Milwaukee, Wisconsin
Lincoln Foundry Corp.	Los Angeles, California
Palmyra Foundry Co., Inc.	Palmyra, New Jersey
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Sonith Industries, Inc.	Indianapolis, Ind.
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Company	Oakland, California
Washington Iron Works	Seattle, Washington

CANADA

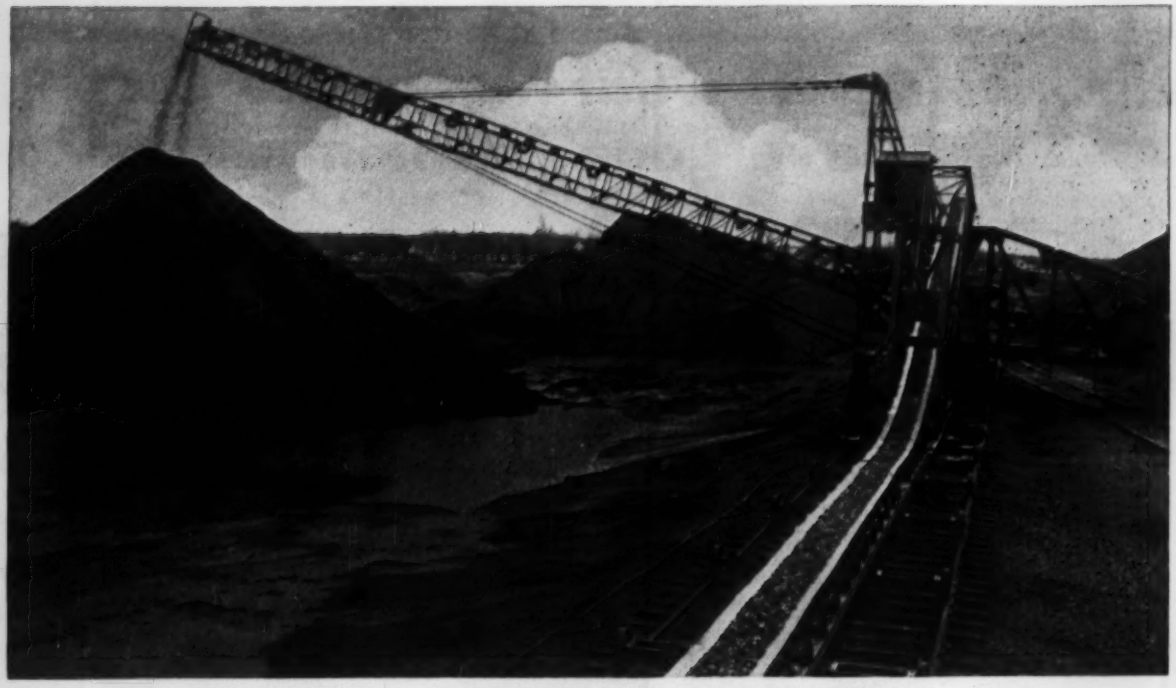
Hartley Foundry Division— London Concrete Machinery Co., Ltd.	Brantford, Ontario
E. Long Ltd.	Orillia, Ontario
Otis Elevator Co., Ltd.	Hamilton, Ontario

Write for your copy of "The Handbook of Meehanite Metals"

This Advertisement Sponsored by Foundries listed above

MEEHANITE METAL® CORP.

714 North Ave., New Rochelle, N. Y.



Washed iron ore from concentrating plant is stocked in 42-ft. high piles by Link-Belt 115-ft. radius revolving, self-propelled belt conveyor stacker with 570-ft. long track mounted trailer belt conveyor.

SURE ROAD TO LOWER HANDLING COSTS

... carry the load via Link-Belt belt conveyors

LINK-BELT offers you the "total engineering" so necessary for top efficiency

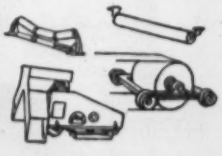
DESIGNED FOR OVERALL EFFICIENCY—Because of its unrivaled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit individual conveyors into your overall system requirements for best results.

DELIVERS FULL RATED CAPACITY—Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews at the customer's request.

ASSURES SATISFACTORY PERFORMANCE—When you rely on Link-Belt as a single source for your complete system, we accept responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems. For all the facts call your nearby Link-Belt sales representative.

13,750-B

BUILT FOR LONG-LIFE PERFORMANCE—Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the specific job.



LINK-BELT

BELT CONVEYOR EQUIPMENT

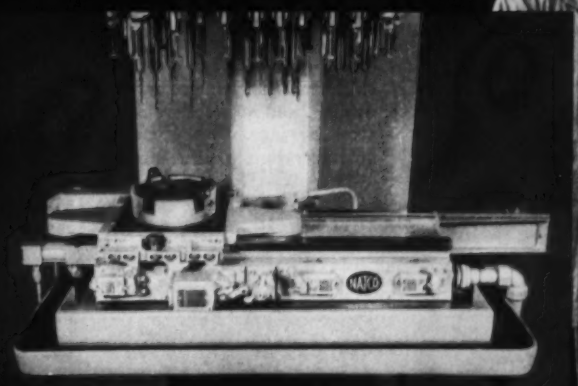
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

NEW NATCO DRILLER DOES WORK OF THREE MACHINES

...DRILLS, CHAMFERS AND TAPS AUTOMATICALLY!

NATCO H-6 LIGHT SENSITIVE, ADJUSTABLE MULTI-SPINDLE DRILLER AND TAPPER WITH...

3 POSITION AUTOMATIC FIXTURE SLIDE



THREE POSITION AUTOMATIC FIXTURE SLIDE IN DRILL POSITION.

TYPICAL FEED CYCLE

POSITION No. 1—DRILL	POSITION No. 2—CHAMFER	POSITION No. 3—TAP
Load Part	Rapid Traverse	Rapid Traverse
Rapid Traverse	Feed Forward	Feed Forward
Feed Forward	Rapid Reverse	Feed Reverse
Rapid Reverse	Index to Position No. 3	Rapid Reverse
Index to Position No. 2		Index to Position No. 1

NATIONAL AUTOMATIC TOOL COMPANY, INC.
RICHMOND, INDIANA

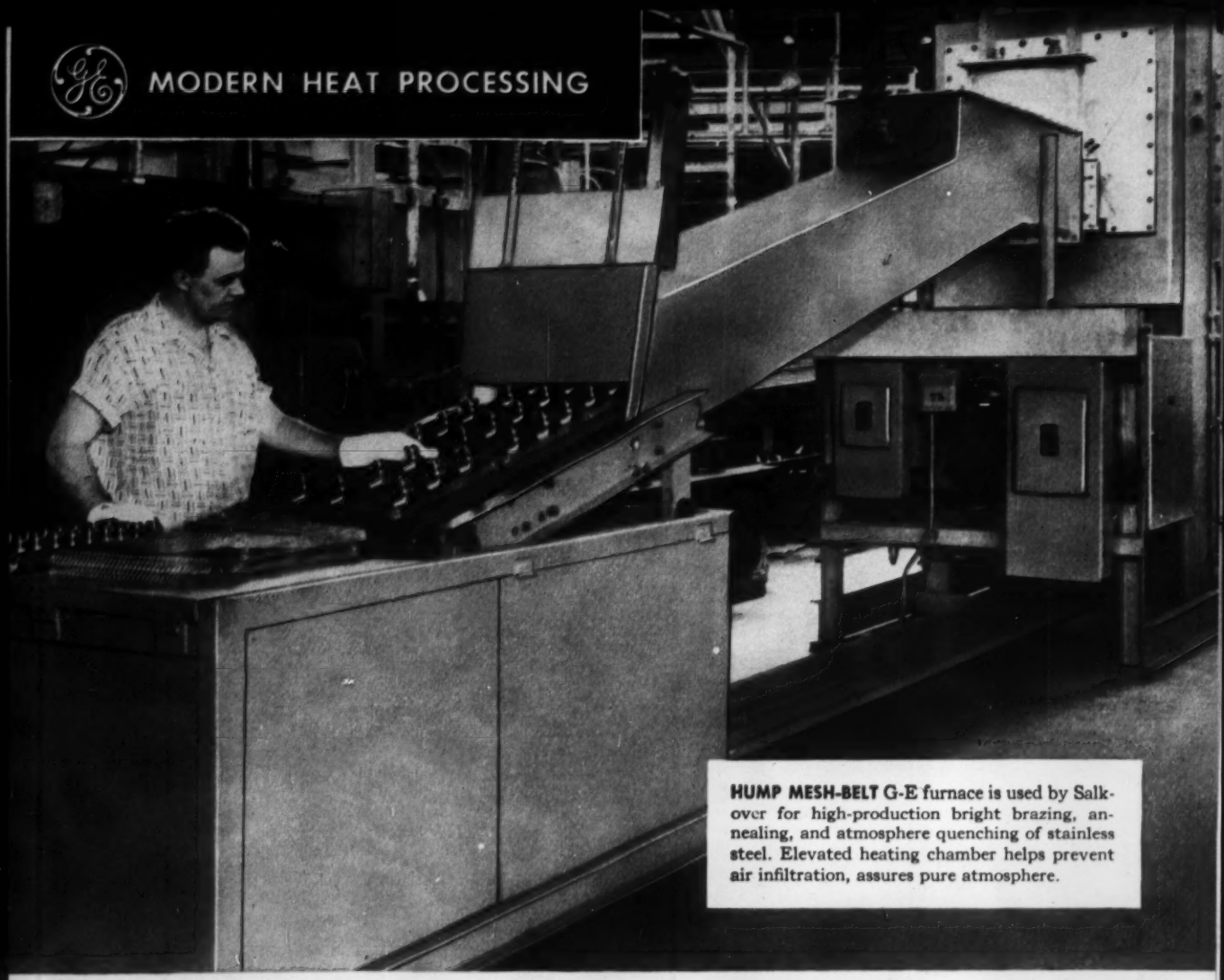
for answers to your Drilling, Boring, Facing and Tapping problems

Call a Natco Field Engineer

CHICAGO, Room 203, 6429 W. North Ave., Oak Park
DETROIT, 10138 W. McNichols Rd.
BUFFALO, 1807 Elmwood Ave.
NEW YORK, 35 Beechwood Ave., Mount Vernon

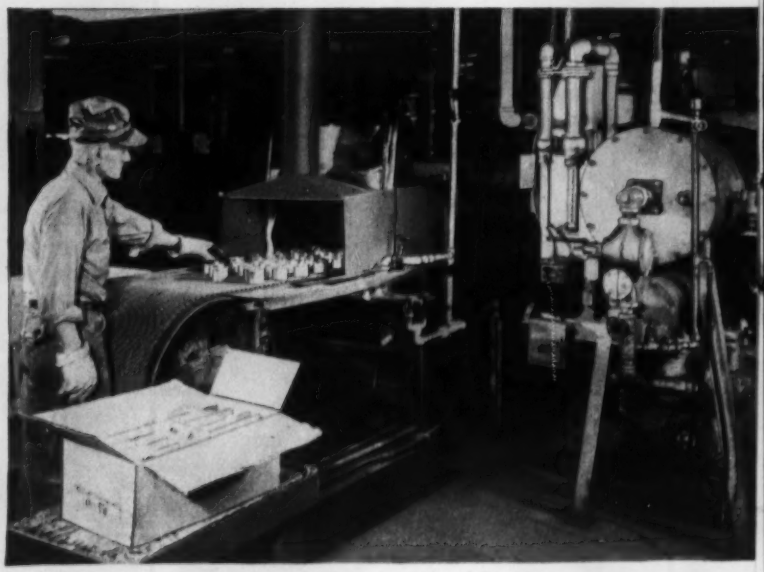
NATCO

MODERN HEAT PROCESSING



HUMP MESH-BELT G-E furnace is used by Salkover for high-production bright brazing, annealing, and atmosphere quenching of stainless steel. Elevated heating chamber helps prevent air infiltration, assures pure atmosphere.

G-E BOX-TYPE BRAZING FURNACE, is one of three used by Salkover Metal Processing for low-volume, high-quality copper brazing and annealing.



CLEAN PARTS EMERGING from Salkover's G-E mesh-belt furnaces are placed directly in shipping boxes. No need for pickling, grinding or polishing because protective atmosphere keeps parts free of scale.

PROBLEM:

How to avoid the high cost of forging and machining

SOLUTION:

Brazing with G-E Furnaces Cuts Costs 25 to 50% for Salkover Customers

Many metal-product manufacturers are constantly faced with the same problem: how to avoid the high cost of forging and machining large volumes of metal parts. More and more of these companies in the Chicago area are finding the solution: fabrication . . . and brazing with Salkover Metal Processing of Illinois, Inc.'s new G-E furnaces.

SINCE SWITCHING to G-E furnace brazing, Salkover's customers have gained savings of between 25 to 50%.

Mr. Lee Mathis, Superintendent of Salkover, explains how their G-E furnaces made these savings possible: "With our seven G-E brazing and bright-annealing furnaces I can give my customers superior quality work. The furnaces in our new, modern heat-processing plant include box, mesh-belt, and roller-hearth types. And we're sold on them for three reasons: the heating units really last, over-all maintenance is very low, and the furnaces also have high productive capacity—all pretty important for the high-volume runs our customers bring in."

THE HEATING UNITS in the General Electric furnaces have so far given Salkover up to two years' life, with no intermediate maintenance. Maintenance of other component parts and down time of the furnaces have also been low.

Also, power input is high and thermal losses low. These features permit Salkover to hold down brazing and annealing costs to customers.

ASK FOR THE SERVICES of your local G-E Apparatus Sales Representative. He will show you how the installation of a G-E furnace can help you cut processing costs and increase the quality of your product.

GENERAL ELECTRIC

VERSATILE G-E ROLLER-HEARTH furnace with return conveyor pays for itself quickly at Salkover. Performs a variety of high-production jobs—brazing, bright annealing, sintering, bright normalizing.

FREE PROCESS BULLETINS

Please send me the Modern Heat Processing and technical bulletins I have checked below.

- ☐ Protective Atmospheres, GEA-5907
- ☐ Furnace and Induction Brazing, GEA-5889
- ☐ How and Where to Use Electric-Furnace Brazing, GEA-3193C
- ☐ Mesh-Belt-Conveyor Electric Furnaces, GEA-4071A
- ☐ Electric Box Furnaces With Cooling Chamber, GEA-4066
- ☐ Roller-Hearth Electric Furnaces, GEA-4072A
- ☐ Electric Furnace Brazing, GER-106
- ☐ Furnace Brazing of Machine Parts, GER-339

Section C 721-5
General Electric Co.
Schenectady 5, N. Y.

Name .....

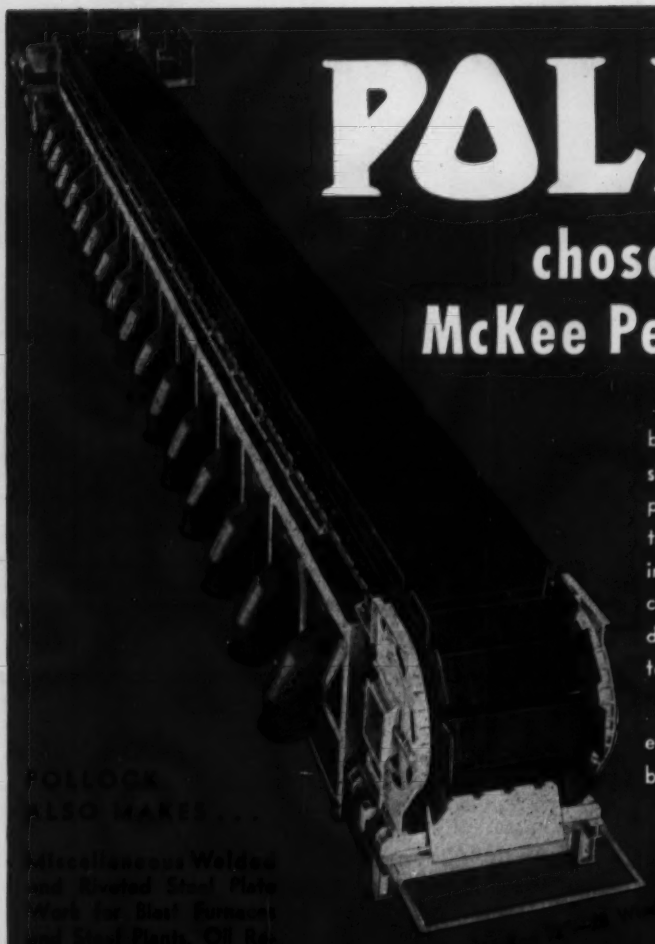
Company .....

Address .....

City ..... State .....

POLLOCK

chosen to construct McKee Pelletizing Machines



The William B. Pollock Company has been chosen by Arthur G. McKee & Company to construct the six (6) pelletizing machines for Reserve Mining Company's new plant at Silver Bay, Minnesota, to process taconite. These pelletizing machines will be built in Pollock's Youngstown, Ohio, plant, shop-erected complete, test run, then thoroughly match-marked, disassembled, and shipped by rail in such a way as to insure quick and efficient field erection.

Pollock is known the world over for its reliable, efficient, heavy steel construction. You, too, can benefit from Pollock's broad experience.

POLLOCK ALSO MAKES . . .

Miscellaneous Welded and Riveted Steel Plate Work for Blast Furnaces and Steel Plants, Oil Refineries, Chemical Plants and Allied Industries.

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

POLLOCK
Since 1863

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

This steel helps a hammer keep its head

It's an Estwing* solid steel unbreakable hammer. Made in one piece. Made of Youngstown high carbon manganese steel.

This steel must be strong and tough. It must possess the necessary qualities for forging, hardening and tempering. Because Youngstown has been furnishing it to accurate specifications for the last 14 years, Estwing's forging and heat treating operations have been fast and accurate.

Result: Costly rejections have been eliminated.
Employees find it easier to work.
Consumers get the world's only one-piece hammer.

By furnishing steel with the exact analysis, Youngstown has helped Estwing to effect substantial savings. Perhaps we can do the same for you. All it takes to find out is a phone call to any one of Youngstown's 28 district sales offices. Why not do it—today? It may save you a lot—tomorrow.

*Manufactured by Estwing Mfg. Co., Rockford, Ill.

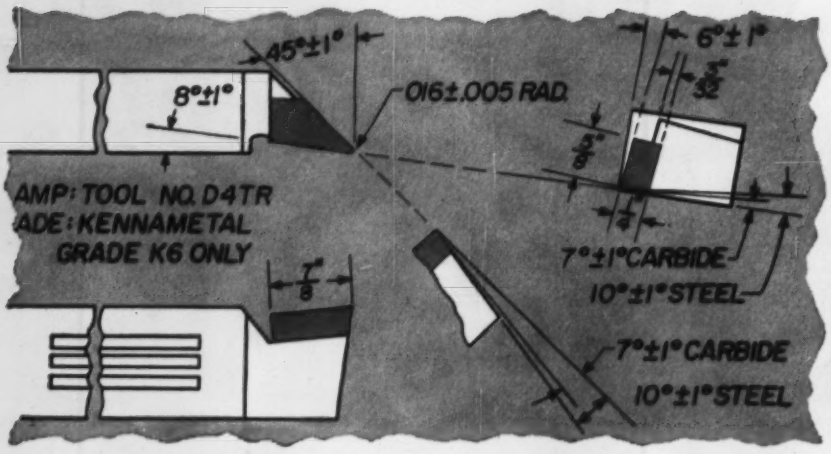
Youngstown QUALITY STEEL

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

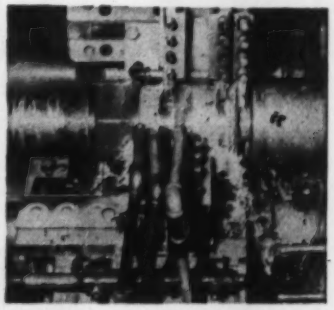
General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

IT PAYS TO BE SPECIFIC!



PROVED BEST TEST AFTER TEST



Grade K2S—Rough turning SAE steel housing assemblies reduced from 45 to 18 minutes each.

PINPOINT THE RIGHT GRADE of carbide for each operation

when you make up your prints

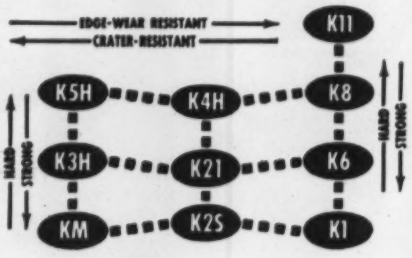
Consistent carbide performance is a must in keeping production lines moving and costs under control. Even brief shutdowns, or shortages along the line due to tool trouble, can send costs zooming . . . at station after station . . . until the added costs far exceed that of the best carbide available. So it pays to get the best.

How do you get the best?

The only way, of course, is to specify the grade found best for each operation —the grade that does the best job by providing:

1. The most pieces per grind
2. The longest life per tool or per insert
3. The most consistent *repeat* performance—regrind after regrind or insert after insert.

When you specify Kennametal* tooling, you can depend on top performance . . . consistently . . . from the first run, through each regrind, tool after tool. It helps you forecast performance with assurance because every Kennametal grade has high *reserve* strength . . . the strength needed to stand up to wide variations in materials and machines.



Kennametal helps keep production flowing.

To be sure of the best performance, specify Kennametal. But be specific . . . specify by grade. Once you have the grade pegged for a job, show it on the print . . . added protection that will help you realize dividends through increased production.

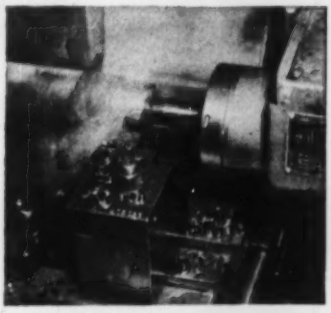
A Kennametal Tool Engineer will help you select the *right* grade of Kennametal for each operation. He works exclusively with Kennametal . . . applying and servicing it. His specialized experience could be of great value to you. KENNAMETAL INC., Latrobe, Pa.

7290

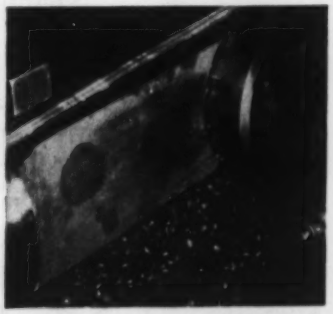
*Registered Trademark

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

Grade K2S—Floor to floor time reduced 34% for machining ends of steel drive shafts, requiring 9 passes.



Grade K3H—Kennametal tooling reduces machining time 60% on chrome-nickel-moly bar stock.



Grade K2S—10 times longer cutting life, with 8 times faster speed and feed with Kennamill* milling.

Leading a Dog's Life..?

ARE YOU IN THE DOG HOUSE BECAUSE OF GRINDING WHEEL PROBLEMS? Then switch to CINCINNATI (PD) WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

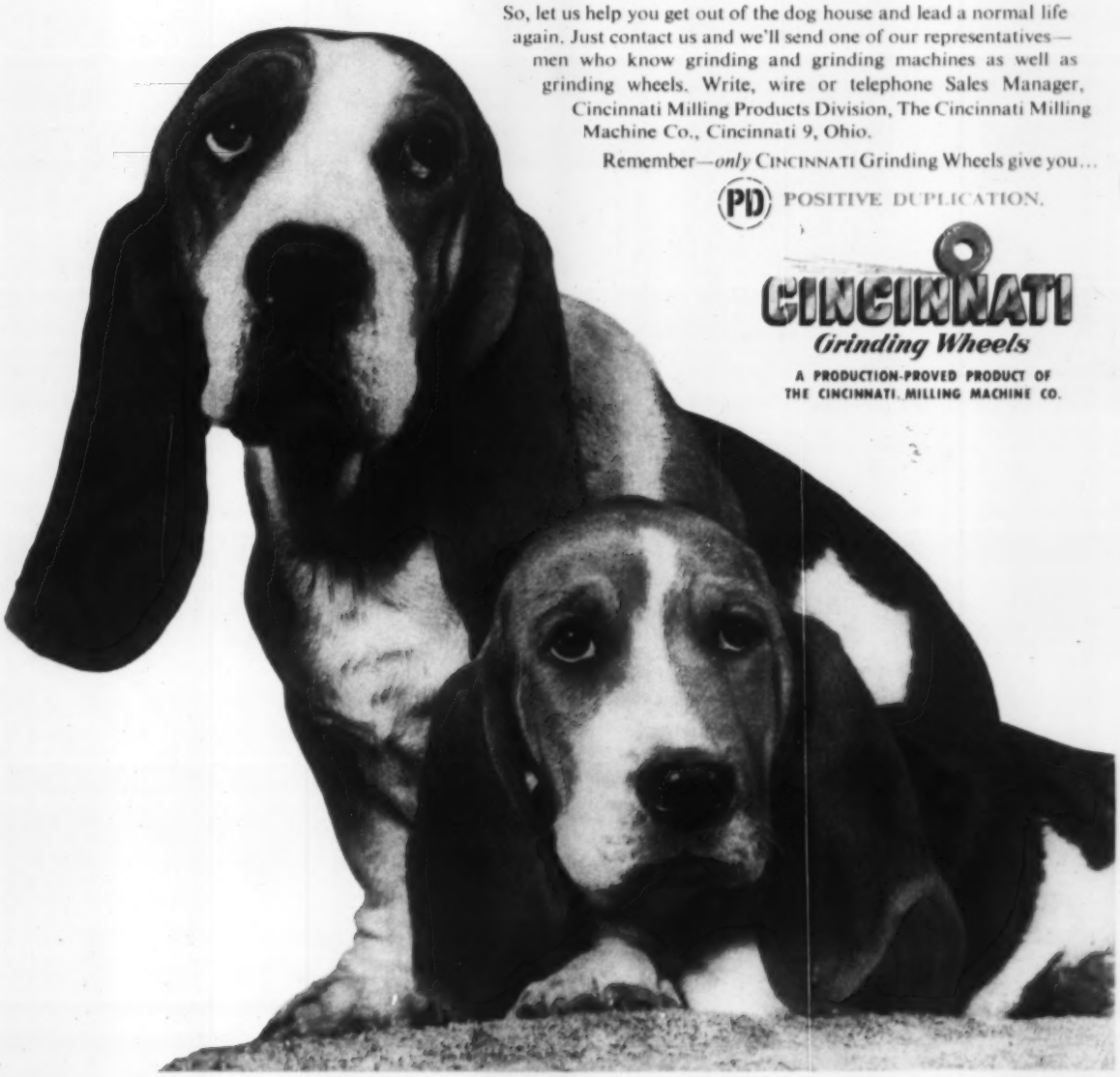
Here's how CINCINNATI (PD) WHEELS can put a twinkle in your eyes and a smile on your face: through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, let us help you get out of the dog house and lead a normal life again. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you...

(PD) POSITIVE DUPLICATION.



CINCINNATI
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

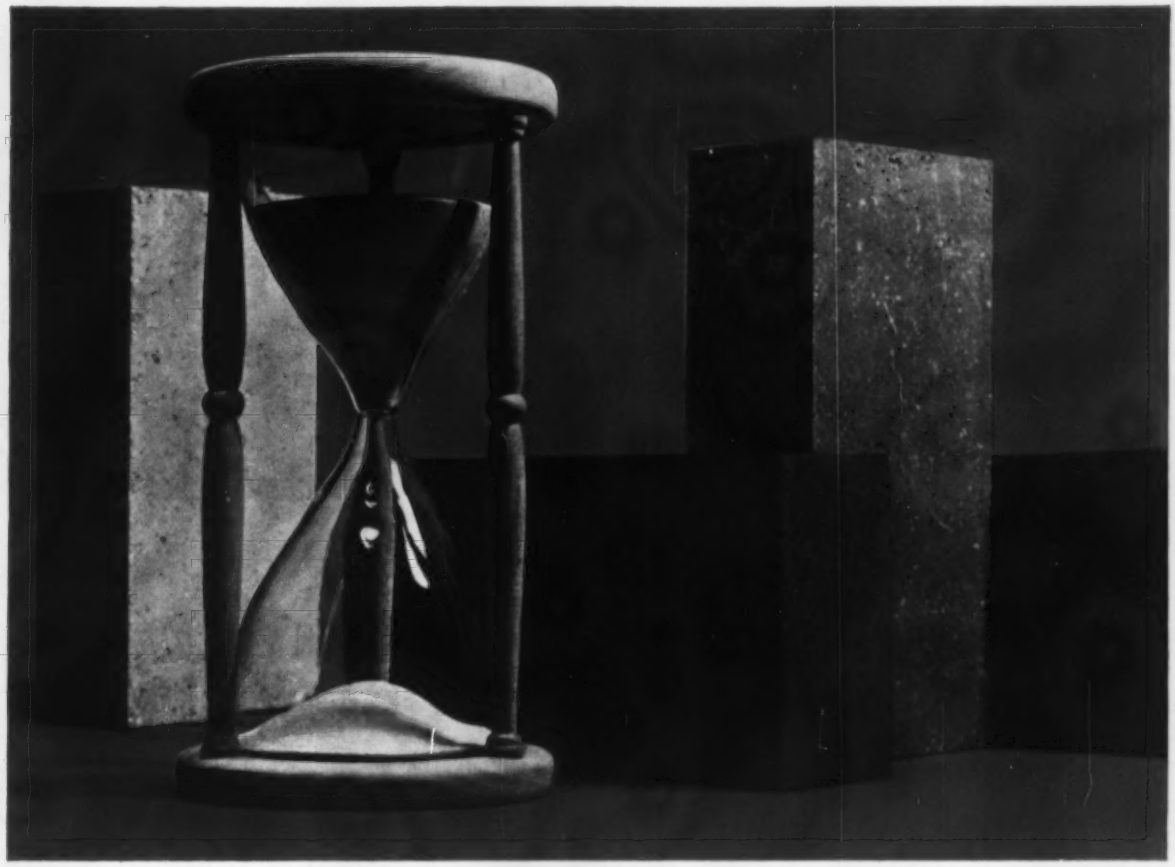
Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

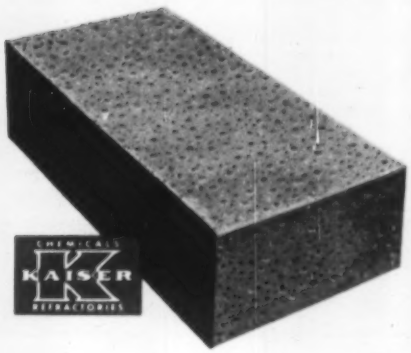
SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.



think of Kaiser Chemicals

Pioneers in Modern Basic Refractories



REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

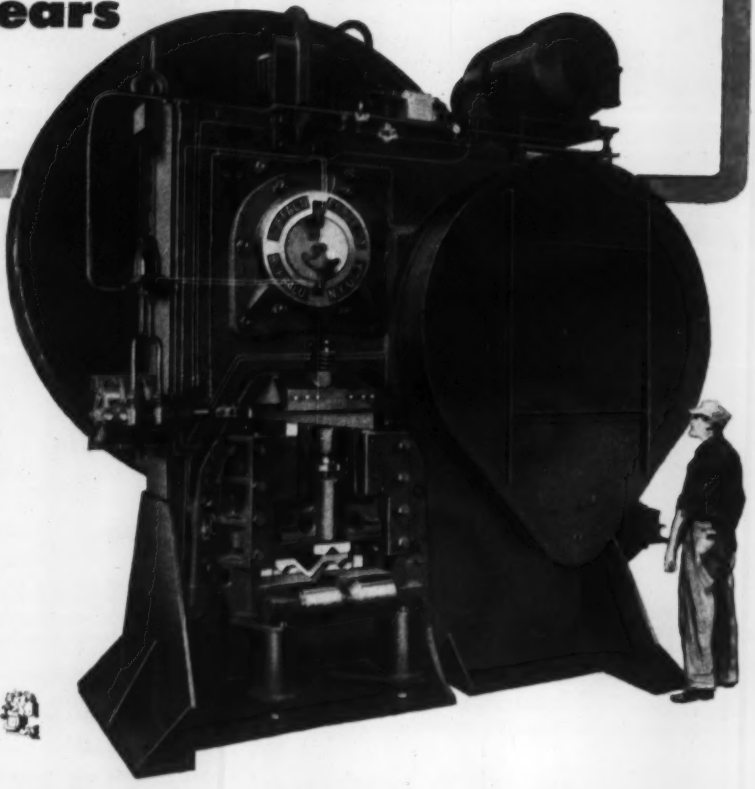
- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

***Now available!* A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

ECONOMY in FORGING STARTS with the CUTTING!

YOU CAN STEP UP OUTPUT and QUALITY with "BUFFALO" Billet Shears



First, the high cutting rates of "Buffalo" Billet Shears step up your production. The big No. 17 at right shears six 9" squares or 10" rounds per minute, and speeds are correspondingly higher in our smaller models. Second, your cuts are clean, square and uniform. The knife penetrates only 3/16", localizing an accurate vertical fracture. *Write today for Bulletin 3295-B and see the "Q" Factor* features that make "Buffalo" Billet Shears your most economical and accurate means of preparing stock for forging.*

**The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

Unique Plastisols make metal finishing news

◆ **Tough, thick, rubber-like chemical resistant coatings have opened up new opportunities for far better metal protection at lower cost . . .**

◆ **Application limitations overcome by vinyl compounds developed by United Chromium . . .**

Plastisols are viscous, resinous liquids that take on a rubbery look and feel when baked. They form thick, chip-proof vinyl coatings with exceptional corrosion resistance, and high dielectric strength. In the past, application difficulties limited their use. But plastisols have become real production coatings now . . . applicable by almost any conventional method.

SPRAYABLE—EVEN UP TO 20 MILS THICK

The first practical sprayable plastisol, Unichrome Coating 5300 has extended use of plastisol corrosion control to large metal objects. Even ductwork and tanks. You can now spray seamless protection 20 mils thick per coat onto ordinary metals to fit them for severest service.

COLD DIPPING—3 TIMES FASTER

Unichrome Coating 4129 solves the problem of economical dipping of wire goods. It permits dipping at room temperature . . . 3 times faster than previous cold dip compounds, and using only half as much plastisol material. Refrigerator shelves, freezer baskets and the like are now getting the better protection of plastisols more economically.

In these two singled-out examples, you see what United Chromium strives to do with all its metallic finishes, organic coatings, dip finishes and equipment . . . to help you cut finishing production cost, or produce a superior product through a better finish. We'd welcome an opportunity to work with you.

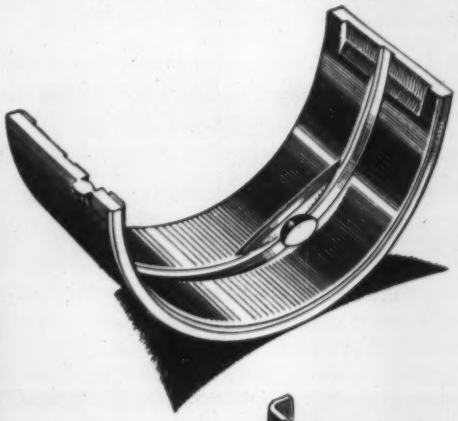
UNICHROME® **METALLIC and ORGANIC FINISHES . . . EQUIPMENT**

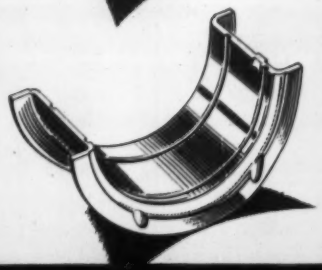
UNITED CHROMIUM DIVISION
METAL & THERMIT CORPORATION

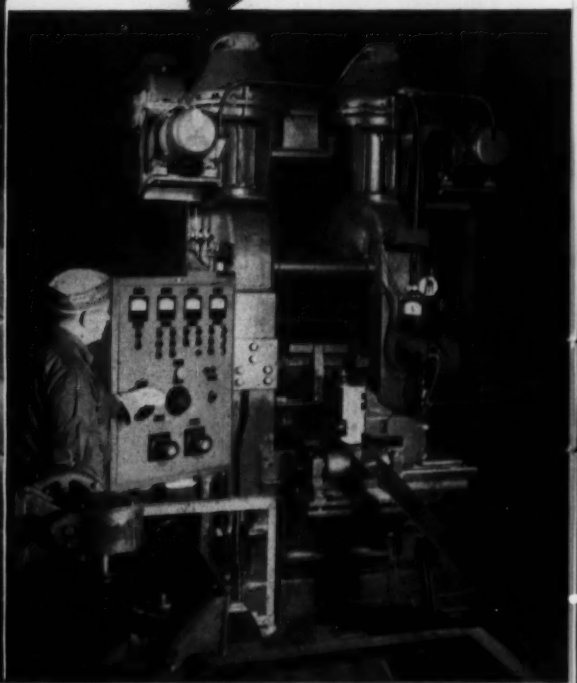
100 East 42nd Street, New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.

World's largest sleeve bearing producer relies on

BLISS MILLS AND PRESSES







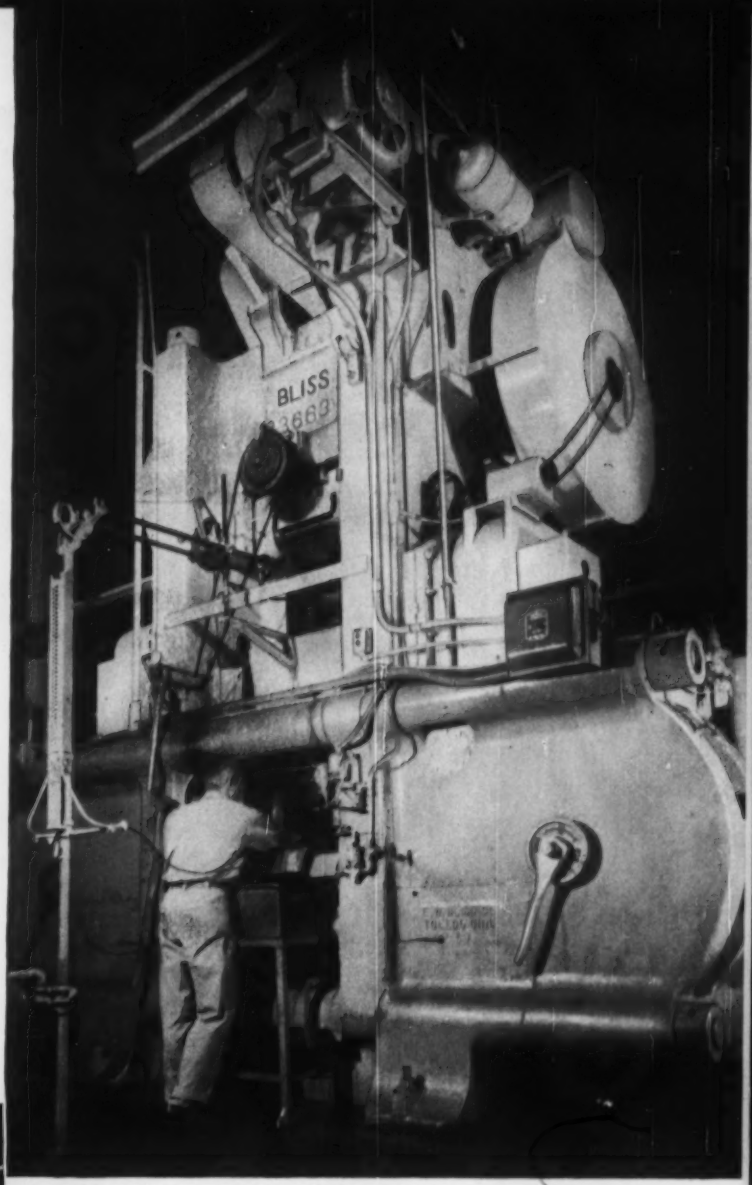
From 3000 to 3500 pounds per hour of steel-backed copper-alloy strip pass through this Bliss mill — a four-high two-stand 5¼" and 16" x 12" (a similar Bliss mill is in operation at Cleveland Graphite Bronze's Caldwell, Ohio plant). Tolerances on the cold-rolled strip are held to ±0.00075. Automatic coiling equipment handles coils off the take-up mandrel.

● Clevite Corporation's Cleveland Graphite Bronze Company division is the world's largest producer of sleeve-type bearings and bushings. Its Cleveland plant turns out millions of these units every month . . . every one produced with the help of Bliss equipment. All the plant's rolling mills—which reduce steel-backed copper-alloy strip to the right gages for stamping—and 98% of its presses were designed and built by Bliss. The Bliss equipment, standard at Cleveland Graphite Bronze for years, includes four single-stand two-high mills, a new two-stand four-high mill, and 106 presses.

According to the plant superintendent, "Performance of the Bliss mills and presses has been very good. We have found the Bliss press a dependable 'work horse' which can be relied on to do a job and do it well."

As you can see, Cleveland Graphite Bronze has good reasons for its practically exclusive use of Bliss mills and presses—another example of a leader in the metalworking field who has found that "Bliss is more than a name . . . it's a guarantee."

Whether your operation involves rolling or stamping, keep abreast of new Bliss developments in these fields by writing us today.



Blanks that have been preformed on Bliss inclinable presses are fed individually into the coining die of this unusual Bliss three-slide knuckle joint press. The main slide closes first, performing the first operation. During the dwell period of the vertical slide the two side slides close, performing the two subsequent operations. Trimming and finishing are the only remaining production steps. Tolerances are held to 0.002–0.003".

A battery of Bliss high-production presses stamp out shapes with machine-gun speed, a short-stroke operation with progressive dies.

BLISS
SINCE 1857

is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Rolling Mill Division: Salem, Ohio
Mackintosh Hemphill Division: Pittsburgh, Pa.

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California; Midland and Pittsburgh, Pa. Branch Offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Pittsburgh, Philadelphia, Rochester, San Jose, Toledo, Washington, D. C., and Toronto, Canada; E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France. Other representatives throughout the world.

Gray Iron mounting plate, for use on a water circulating pump, was cast to shape with holes cored.

Casting or steel plate ...which costs less?

This pump mounting plate when it was flame cut from hot-rolled plate and drilled, cost $1.92.

Then it was redesigned in Gray Iron

Now it costs $1.33 . . . a saving of 30%. The holes are cored and the only finishing on the casting is surface grinding on both sides.

Economy is only one reason for redesigning parts in Gray Iron. This versatile metal can give you strength, rigidity, wear and corrosion resistance . . . and many other unique engineering advantages.

Call your nearest Society member foundry and the full facilities of this association will be available to help you. Or, write direct to Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

MAKE IT BETTER WITH GRAY IRON

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

GRAY IRON FOUNDERS' SOCIETY

Bailey EQUIPMENT

contributes to

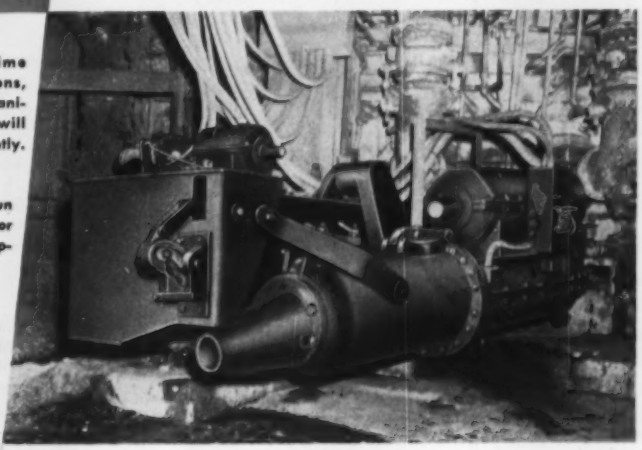
STEEL PLANT

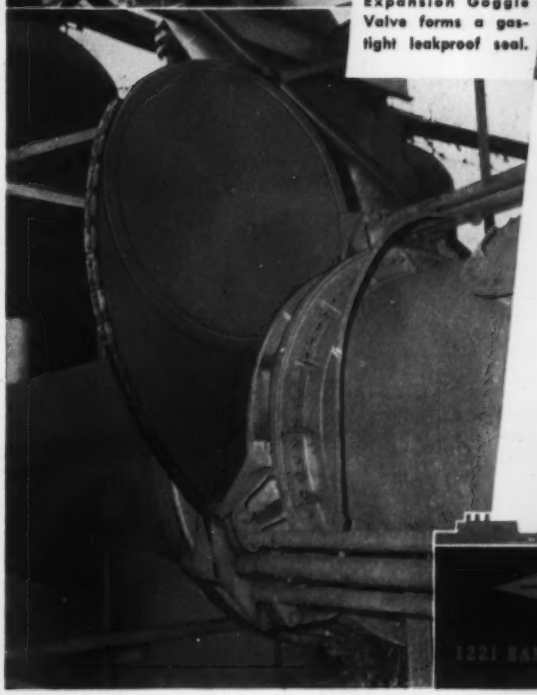
Safety and Efficiency

Regardless of time between operations, this Bailey Mechanical Goggle Valve will open or close instantly.

The Bailey Clay Gun has ample power for maintaining long tapping holes.

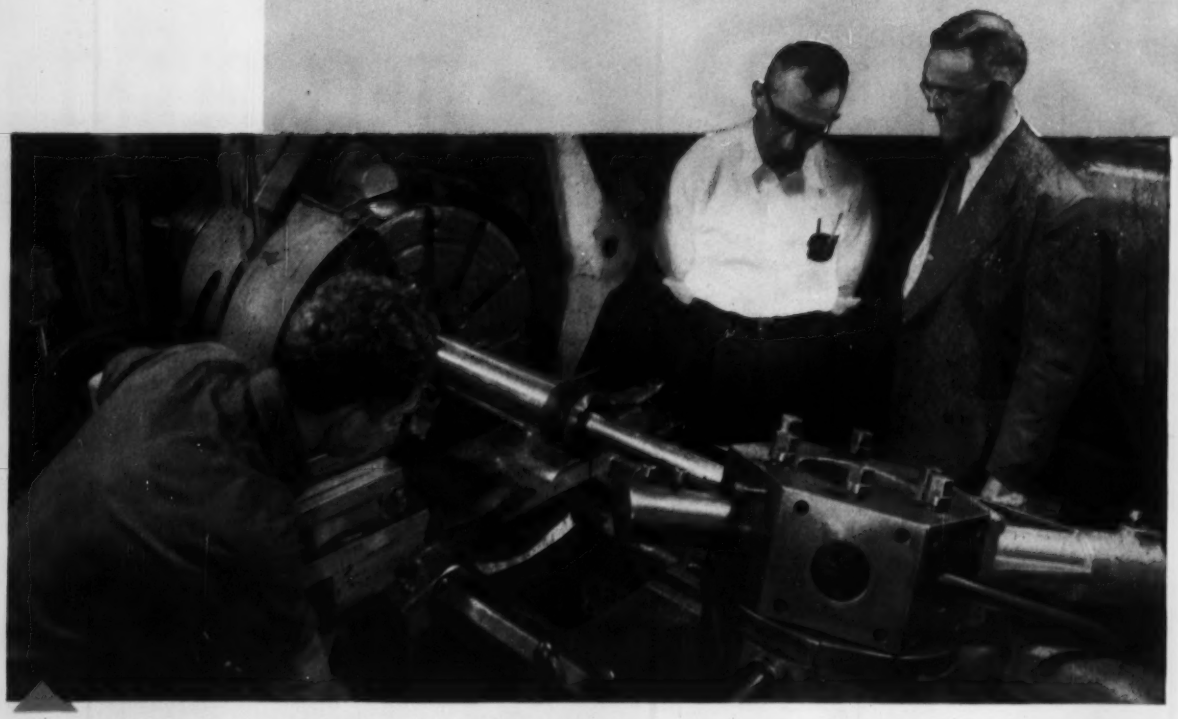
Safe and dependable, this Bailey Thermal Expansion Goggle Valve forms a gastight leakproof seal.





The dependability of Bailey Equipment plays a part in the safe, efficient operation of many major steel plants. All Bailey Equipment is designed and manufactured with two basic considerations in mind—protection for men and equipment, and operation that is dependable and economical.

Drilling, Threading,
GULF ELECTRO



Mr. E. T. Edvinson, Shop Foreman, and Gulf Sales Engineer Ralph E. Parkhurst check up on the performance of Gulf Electro Cutting Oil in a turret lathe where a spindle for a Cone Automatic Machine is being reamed. Steel is SAE 8620.

Gulf Electro Cutting Oil provides high sulphur activity for this drilling operation where finger holders for Cone Automatics are being formed. Steel is SAE 1045.

or Reaming . . . tests prove CUTTING OIL BEST

at Cone Automatic Machine Company, Windsor, Vermont

A lineup of Cone Automatic Machines is readied for shipment. Note the Gulf Rust Preventive being sprayed on vital parts for protection during shipment. Tests in this plant proved the superiority of Gulf Electro Cutting Oil in drilling, threading, and reaming with many types of steel.

"We tried a number of cutting oils over a period of years before we settled on Gulf Electro for jobs that require a sulphurized fluid," says Mr. E. T. Edvinson, Cone Shop Foreman. "Gulf Electro Cutting Oil delivers the best results for us, and has contributed to longer tool life and greater production."

Here's why Gulf Electro Cutting Oil performs better on the jobs for which is is recommended: Thanks to a special Gulf process of combining sulphur, it provides greater sulphur activity over the entire range of a cutting operation. This means better protection for the tool and a smoother machining operation.

Let a Gulf Sales Engineer help you discover opportunities to put Gulf Electro Cutting Oil to work—profitably—in your shop. Write, wire, or phone your nearest Gulf office.

GULF

Gulf Oil Corporation · Gulf Refining Company

1822 GULF BUILDING, PITTSBURGH 30, PENNSYLVANIA

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

GIVES ADDED LIFE AND PROTECTION TO FIREBRICK JOINTS

'SAIRSET gives you one mortar for all types of service—industrial furnaces, boilers, ladles, flues and stacks, and rotary kilns. Its use is universal. It is recommended for laying high duty or super duty fire-clay brick, high alumina brick, or insulating firebrick. 'SAIRSET welds the brick into a one piece unit at temperatures too high for less refractory mortars—or at temperatures too low for heat-setting mortars to form a strong ceramic bond.

Firebrick linings last longer when protected with 'SAIRSET. It insures full gastight joints . . . protects the firebrick lining against destructive spalling and shrinkage . . . reduces joint erosion due to chemical attack of slags or dust laden fumes . . . prevents penetration of joints by molten metal or fluid slag.

DOES NOT STIFFEN IN THE DRUM

The plastic consistency of 'SAIRSET makes it easy to remove from the drum. No time is lost and no mixing due to stiffening is necessary. Permits long storage and affords extra savings through the purchase of large quantities.

NO SETTLING

'SAIRSET does not settle out of suspension in the mortar box. Constant agitation is unnecessary to maintain the proper consistency.

EASY TO USE

'SAIRSET comes on the job ready mixed to troweling consistency—with all of its plasticity and other properties fully developed to bring you maximum efficiency and make using easier.

PACKAGED IN READY MIXED PLASTIC FORM

No long soaking period is required to develop the plasticity and smooth workability of 'SAIRSET. Special equipment is used to thoroughly mix 'SAIRSET before it is packaged in airtight containers. Available in 200 and 500 pound metal drums and 5, 15, 50 and 100 pound metal pails.

Your local A. P. Green distributor carries 'SAIRSET and other refractory products in stock. You'll find him listed in the yellow pages of your telephone directory, or write

A. P. Green REFRACTORY PRODUCTS

A. P. GREEN FIRE BRICK COMPANY
Mexico, Missouri, U. S. A.
PLANTS: Mexico, Mo. • Woodbridge, N. J. • Sulphur Springs, Texas
In Canada: **A. P. GREEN FIRE BRICK COMPANY, LTD.**
Toronto 15, Ontario

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF

Subsidiary of The Colorado Fuel and Iron Corporation

California giant Sequoias—largest of all trees.

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

FLEXLOC AT WORK

Power Hack Saw Builder Fastens blade guides with FLEXLOC self-locking nuts. Eight of these one-piece, all-metal locknuts are used in this assembly. And they won't work loose, regardless of vibration.

You can get the same dependable service. FLEXLOCS come in a wide range of sizes, types and materials. They are stocked by leading industrial distributors everywhere. Ask your local man for Bulletin 866. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

• • •

Use FLEXLOCs anywhere:

ON ROUGH BOLTS. FLEXLOCS smooth out bolt threads without damaging their own threads.

IN TEMPERATURES TO 550° F. in plated nuts and even higher in unplated ones. High temperatures do not affect FLEXLOCS. Nuts with non-metallic inserts fail under such conditions.

AS LOCK OR STOP NUTS. After at least 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC stays put.

REGARDLESS OF MOISTURE, OIL, DIRT AND GRIT. Even conditions like these do not affect the locking ability of FLEXLOCS.

FLEXLOC®
LOCKNUT DIVISION
sps
JENKINTOWN PENNSYLVANIA

To meet an estimated heat loss of 7,400,000 Btu per hour in their new plant, Hunter Fan installed five 1,000,000 Btu, four 500,000 Btu and one 400,000 Btu Dravo Counterflo Heaters.

The new L-shaped factory building, 350 by 420 feet, supplies 108,000 square feet of manufacturing and storage space. Dravo Heaters meet varying heat requirements easily despite the fact that one-sixth of plant's total wall space is window area.

Southern factory finds economical answer to plant heating problem

Much of the South's rapid industrial expansion can be credited to its year-around sunny, mild climate. But this same climate has presented some unique heating problems to manufacturing firms like Hunter Fan and Ventilating Company of Memphis, Tennessee. Their particular problem was to provide an efficient yet economical heating system for their new factory building.

In addition to the normal heating requirements, experience indicated that "chill" conditions prevailed during many winter and early spring days, particularly in the morning hours. This "part time" heat requirement indicated the need for a conventional system that could not only handle their normal needs but also have sufficient flexibility to meet these varying demands. Specifically what they needed, Hunter plant engineers decided, was a system that instantaneously handled a wide variation of heat requirements and yet was low in initial cost, maintenance, and compact enough to fit limited space in modern, low factory structure.

As cooling and ventilating specialists, they examined and evaluated all types of heaters and heating systems. Ten Dravo *Counterflo* heaters were found to be the ideal answer to their plant heating requirements.

Regardless of your plant location—East, West, North or South—you'll be dollars ahead by carefully investigating Dravo's quality heaters to see how their many features work for over-all heating efficiency and economy every day of operation. The coupon below will bring you all of the details—mail it today!

Dravo Corporation, Department A-1109
Fifth & Liberty Avenues
Pittsburgh 22, Pa.

I am interested in Dravo Heaters for _____

☐ Please send literature
☐ Please have a representative call

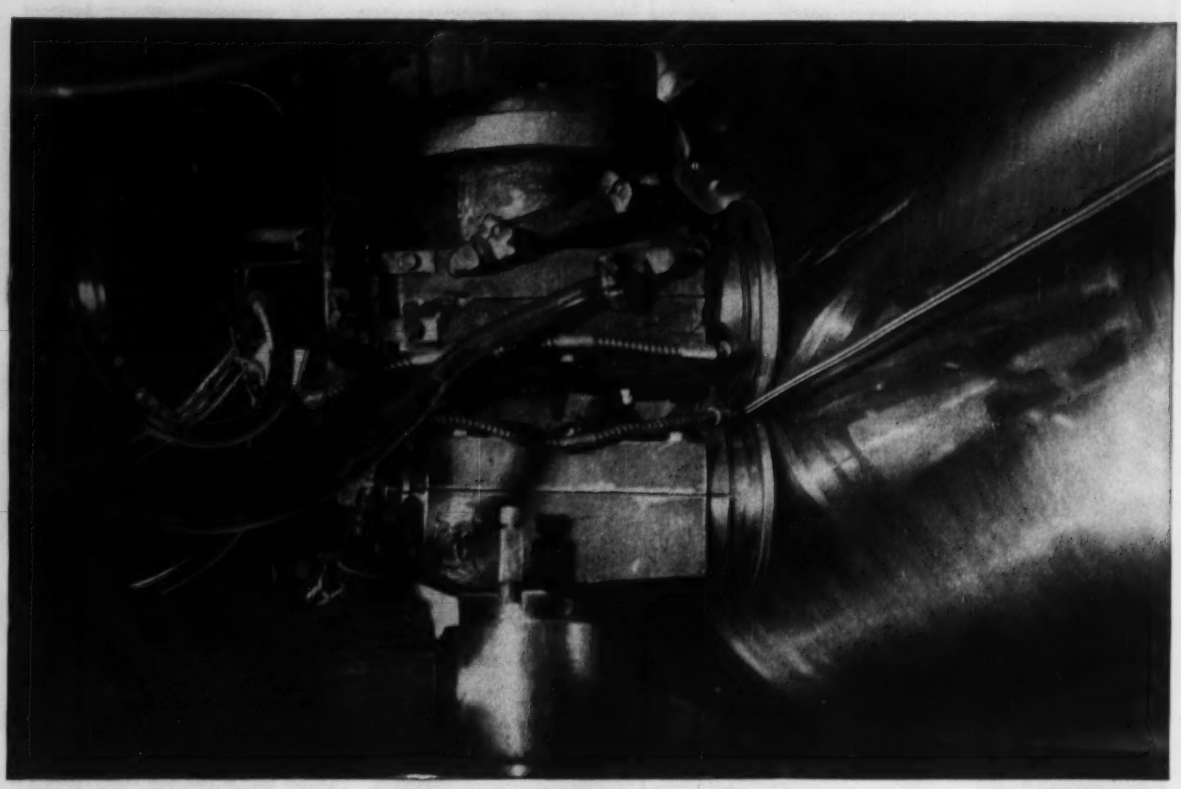
Name _____

Company _____

Address _____

City _____ Zone _____ State _____

DRAVO
CORPORATION
Pittsburgh 22, Pennsylvania
Representatives in principal cities



Skyline's Production Line methods such as this seam welding operation have reduced prices of Monel nickel-copper alloy tanks to a point within reach of most boat owners.

This and other Inco Nickel alloys provide superior fabrication and mechanical properties. That's why Inco alloys are widely used in Skyline products.

Bill Jung doubles company's size and business...

MONEL helps young engineer break cost barrier

A year ago, BILL JUNG, a successful engineer, headed a small company that fabricated air-borne equipment exclusively.

Today, his company . . . SKYLINE PRODUCTS, INC., Deer Park, Long Island, New York . . . is twice as big. All because Bill Jung had a bright design idea that was made practical by Monel* nickel-copper alloy.

Watching his Sciaki spot and seam welders speed the output of aircraft weldments, Bill reasoned: why not use this method to weld fuel and water tanks for boats . . . resistance welding would cut the cost.

He checked with boat builders. He found not only definite interest, but also universal preference for Monel alloy because of its strength and corrosion resistance.

$40 cut from cost

However, not everybody could afford this alloy. Bill learned that hundreds of tanks were made of materials like steel or copper, coated with zinc, tin or lead to cut costs. But unlike Monel nickel-copper alloy, these materials do not respond to resistance welding.

Bill set up to make tanks by resistance welding. And typical of the result, Skyline now sells a welded Monel fuel tank for $85. The same size tank used to cost $125.

Along with fuel and water tanks, Skyline now produces hardware for boats, and other equipment made of Monel alloy. Because this alloy is tough, long-lasting, and corrosion-resisting all the way through, it withstands heat and cold as well as many acids, alkalies and salts. It's a material for use where you want strength and corrosion resistance . . . as well as low-cost production.

*Reg. Trademark

Whenever you are faced with a problem of finding an alloy to suit your needs, it will pay you to investigate Inco Nickel Alloys. A brief description of their properties and uses is contained in "Standard Alloys for Special Problems." A copy is yours for the asking . . . Write for it now.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK

50 YEARS OF *Nickel Alloy Progress* PIONEERED BY MONEL
1905 · 1955

Metalworking Outlook

7 Million Autos in 1956?

Auto executives predict 1956 sales will hit 6 or 7 million cars. That will be the second or third highest total in history and would compare with this year's anticipated record of between 7.2 and 7.5 million. Chrysler Corp.'s L. L. Colbert says: "Record sales so far this year are not a temporary phenomenon." Chrysler, incidentally, spent $175 million to develop and put into production its 1956 line, compared with $250 million spent on the 1955 introductions.

Capital Outlays Climb

A new peak in plant and equipment expenditures in the fourth quarter should boost capital outlays this year to $27.9 billion. The Department of Commerce and the Securities & Exchange Commission point out that such a total would be 4 per cent above last year and only 1 per cent below the all-time high of $28.3 billion spent in 1953. The 1955 total is 3 per cent higher than what it was expected to be at the start of the year. Significantly, the government's move to tighten up on tax amortization grants hasn't dampened business optimism one iota.

Dozen Expansion Goals Reopened

The Office of Defense Mobilization will re-establish 12 expansion goals. They include additional facilities for petroleum production and distribution, glycerine output, commercial aircraft, electric power for the Northwest and Southeast; freight cars, rutile (titanium ore), ocean-going tankers, distribution transformers and high-voltage switchgear. ODM is still to rule on whether tax amortization will be allowed for steel expansion (see page 60).

Harvey: New Aluminum Producer

Harvey Machine Co. will be the newest primary aluminum producer. It will begin immediate construction of $65-million facilities at The Dalles, Oreg., which will add 108 million lb annually to the nation's primary capacity. The Harvey plant will be financed from private sources, with the government promising assistance, if necessary, by means of loan guarantees and advance payments for production. The Bonneville Power Administration will provide power for the facilities.

Stockpile Status

Aluminum Co. of America, Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. have been told by ODM to deliver 50 million lb of aluminum to the General Services Administration in the fourth quarter. Of that, 28 million lb will go to the stockpile and 22 million to the United Kingdom under terms of a 1952 agreement. That means that ODM is forgiving shipment of about 150 million lb of aluminum to the stockpile in

the fourth quarter. That brings to a total of about 500 million lb the aluminum forgiven from stockpile shipment.

Shift in Titanium

ODM has suspended a program of government assistance to create additional titanium sponge capacity, but will keep the sponge status under review. Sponge production this year is expected to reach 8000 tons and may hit 22,500 tons by 1957. Output is considerably ahead of the rate of military use of the metal and appears sufficient to provide for projected military consumption until 1957. Titanium sponge producers are E. I. du Pont de Nemours & Co., Titanium Metals Corp. of America, Cramet Inc., Union Carbide & Carbon Corp. and Dow Chemical Co.

Defense Spending $34 Billion

After conflicting statements, defense spending for fiscal 1956 looks like it will be about $34 billion, as forecast in the budget documents. But spending for July indicates that both the Army and Air Force started the fiscal year at a faster rate than in fiscal 1955, when expenditures amounted to about $35.5 billion.

Hassle on Foreign Tools

ODM will investigate machine tool builder charges that the U.S. is buying equipment abroad that should have been purchased from domestic companies. An interagency committee will study the problem. Another reason for the study is the pending Defense department program to buy $100 million worth of reserve tools, plus an ODM plan to acquire another $65 million worth of tools for steam turbines and reduction gears.

Of Things To Come

In 1975, wages will rise 25 per cent from what they are today and the work week will sink from 40.5 to 34.5 hours. So predict executives of 26 American corporations queried by Hugh W. Long & Co., investment company underwriter. Other predictions: The population will jump from the present 162 million to 213 million and employment from 65 million to 85 million. Instead of 50 million autos crowding our roads, we shall have 80 million or more.

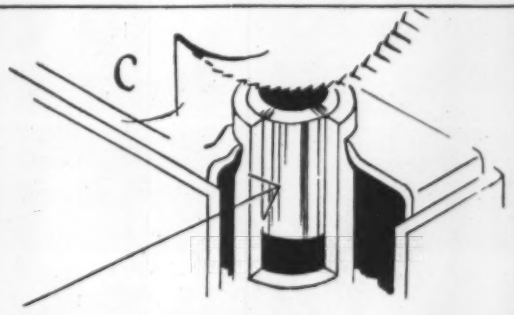
Straws in the Wind

Industry interest in small business production pools has dropped so sharply that the program is virtually inactive . . . Industry's expansion of defense production in the ten Missouri River Basin states totaled $1.9 billion for 1090 new or expanded facilities from early 1950 to mid-1955 . . . Kaiser Aluminum paid $3.8 million to GSA to complete the purchase of the aluminum extrusion plant at Halethorpe, Md. . . . The Labor department has ruled that Ford Motor Co. need not consider as wages the contributions the firm makes to supplemental unemployment pay; the ruling removes one of the hurdles toward putting SUP into effect.

HOW ARMCO 17-7 PH STAINLESS STEEL

keeps this lighter in shape

A tiny hardened Armco 17-7 PH Stainless Steel bushing is the key to dependability and long service life of a well-known lighter.



WHAT THE STAINLESS BUSHING DOES

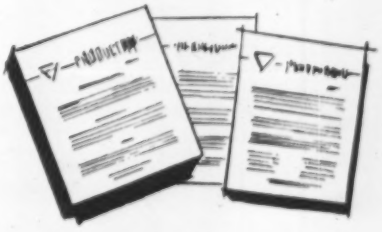
This collar in the top of the tube keeps the flint in alignment and prevents jamming. The collar must be perfectly formed and very hard. That's why it's made of Armco 17-7 PH Stainless Steel, precipitation hardened.

NO "FLOPOVER" FLINTS

In an ordinary flint tube, repeated pressure of the spark wheel against the flint causes the end of the tube to expand. This permits the flint to "flop over," making the lighter useless.

WHAT THIS STEEL OFFERS YOU

Consider the advantages of Armco 17-7 PH Stainless Steel for your products. It can be drawn and formed in the annealed condition to close tolerances. Then, it can be hardened at low temperatures to tensile strengths of around 200,000 psi. It is "transformed" by holding at 1400 F for 1½ hours and cooling to 60 F or below. Hardening is completed by heating to 950-1050 F, holding for ½ to 1½ hours and cooling.



GET COMPLETE DATA

Armco 17-7 PH is produced in sheets, strip, plates, bars and wire. Besides, there is a single heat treatment precipitation-hardening stainless steel, Armco 17-4 PH, made in bars, wire and billets only. For complete information on these special Armco Stainless Steels, just fill out the coupon and mail it to us.

ARMCO

ARMCO STEEL CORPORATION
1585 CURTIS STREET, MIDDLETOWN, OHIO

SPECIAL STEELS

Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

ARMCO STEEL CORPORATION, 1585 Curtis Street, Middletown, Ohio

Send me information on Armco Precipitation-Hardening Stainless Steels.

Name:_____

Firm:_____

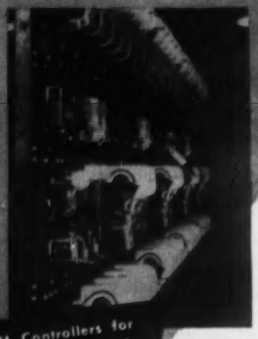
Street:_____

City:_____ Zone:_____ State:_____

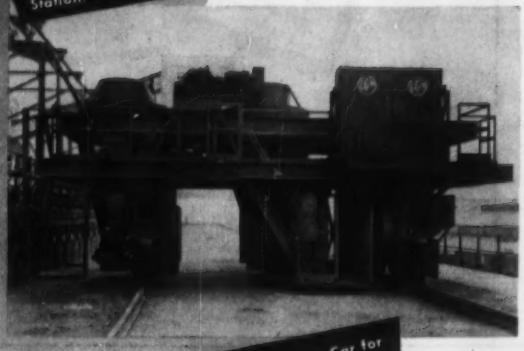
Coke Pusher built by Wellman Engineering Company, for the Wilputte Coke Oven Division. Door-Machine is in left foreground.

Improved Operation

A GOOD REASON FOR SPECIFYING EC&M CONTROL FOR COKE OVENS



EC&M Controllers for automatically operating four car-hauls at the Coke Screening Station.



Koppers Larry Car for charging coal into ovens.

These coke oven machines are operated by EC&M Controllers using EC&M LINE ARC Magnetic Contactors and EC&M TIME-CURRENT method of acceleration.

EC&M Control has the reputation for being accurately engineered for the job and likewise designed for long life. This quality apparatus is known for its low upkeep.

When buying new machines or revamping existing installations, it pays to specify EC&M Control equipment.

E&M

THE ELECTRIC CONTROLLER & MFG. CO.

4498 LEE ROAD • CLEVELAND 28, OHIO

After the Show, What?

When the world's greatest machine tool show came to a close in Chicago last week, most of the 200,000 metalworking people in attendance left for home dissatisfied.

During the two-week show, they became dissatisfied with many of the machine tools and production setups in their plants.

It was like stepping into an automobile showroom and comparing the old car with the new 250-horsepower jobs sporting power steering, brakes, seats, radio antennas and effortless, automatic transmissions.

They were fired with ideas for making their products faster, cheaper and better with new machines as easy to operate as superpowered 1956 automobiles. They found:

The new machines are heavier and more rigid.

They're easier to maintain and repair.

Power, compared with that of only five years ago, has been increased 50 per cent and more.

More units, such as cross slides, have power controls—with pushbuttons and dials replacing levers and wheels.

Cutting speeds are going still higher, with 2000 surface feet per minute becoming practical for lighter cuts.

Automatic gaging and tool adjustment are being built in.

Tape and punch card controls make it possible to switch quickly from one job to another.

Tolerances are moving from increments of thousandths of an inch toward half ten-thousandths and millionths.

An odd assemblage of machines is inconsistent with the concept of the modern metalworking plant. Machine tools are considered part of a production line whether the operation is job shop or mass production.

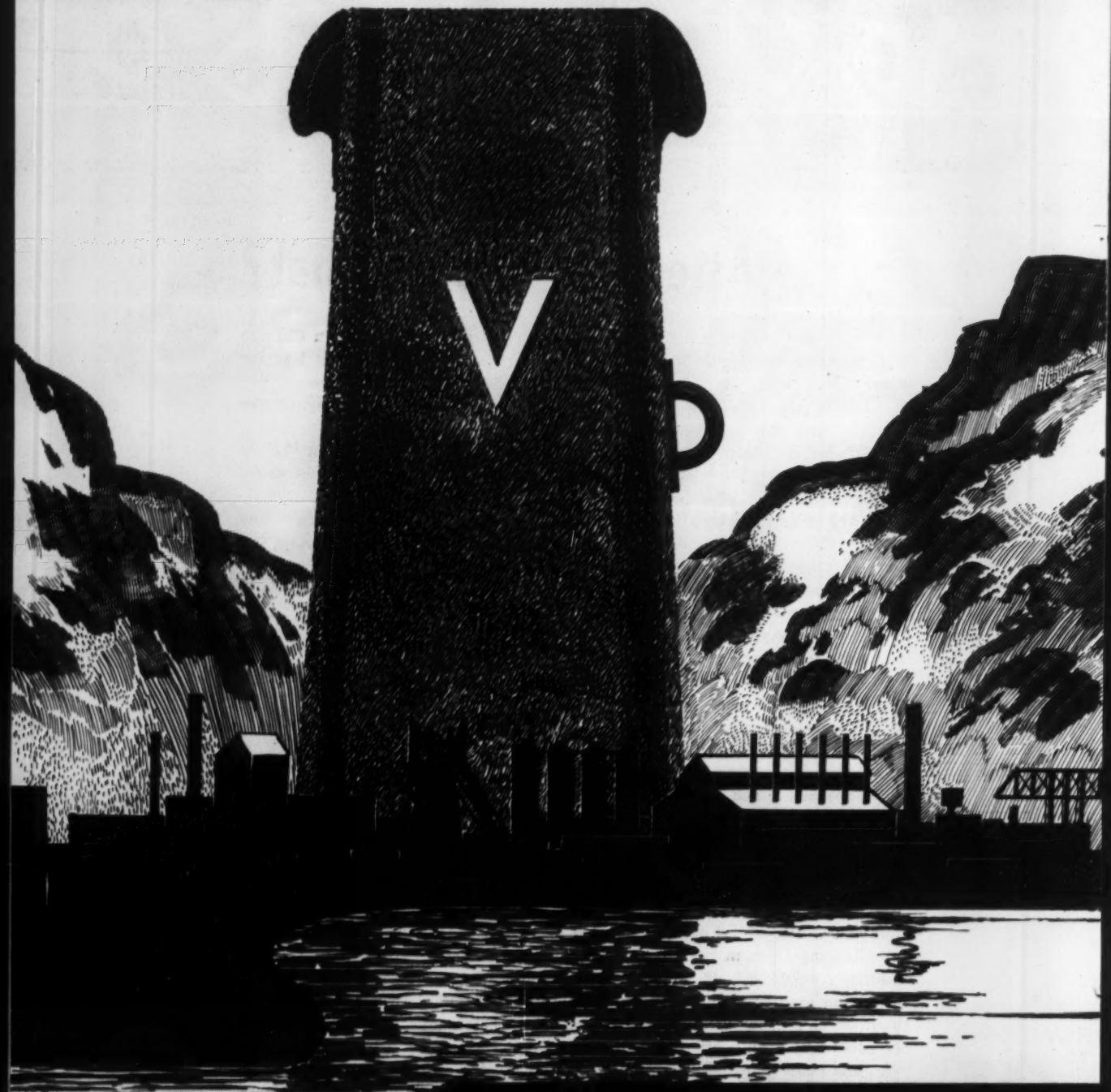
The machines in that line must be likened to building blocks that can be inserted, pulled out or rearranged, depending upon production requirements. The "line" can be a single, properly tooled standard machine. It can be a combination of standard and special-purpose machines arranged in logical sequence, or hooked up with conveyors and part banking systems.

The show provided the ideas and incentives for modernization, but the job is not done. Prompt follow-through is needed to make certain obsolete methods and machines are replaced. The penalty for doing nothing is to succumb to more enterprising competitors.

Irwin H. Such

EDITOR

VALLEY



INGOT MOULDS

Valley Mould and Iron Corp.

General Offices: Hubbard, O.

Western Office: Chicago, Ill. Northern Office: Cleveland, O.

Component Prices Head Up

(Average % increase since July)

Antifriction bearings	7
Castings, die	3-8
Castings, gray iron	5-8
Castings, malleable	5-6
Castings, nonferrous	4
Castings, steel	5-8
Control equipment, electric	10
Fasteners	8-10
Forgings	8-10
Gears	10
Motors, electric (fractional)*	5
(integral)	10
Rubber goods, mechanical	7-8
Screw machine products	8½
Springs, wire shapes	8
Stampings	4-6
Weldments	4-6

*Price increases scattered but spreading
Estimated by STEEL

Costs: Parts Men Catch Up

RESIGNEDLY, metalworking has taken a 7-per-cent increase in its component costs since July. Outlook: By year end, the increase will broaden out until it averages nearer 10 per cent.

For component makers, material and labor costs had been piling up since 1953's labor settlements. Big, efficient producers were squeezed; many smaller outfits were operating hand to mouth or were forced out of business.

Paradox—The summer production race explains much of the ease with which parts men passed on their price increases. Steel, basic ingredient of most metalworking costs, went up for all. Most have been able to take the opportunity to relieve accumulated pressure.

But some parts makers, notably founders, stampers and weldment makers, have not been able to pass on much more than their increased material costs. This is reflected in an average increase of 5 per cent in these categories as opposed to better than 8 per cent for the others; also, it accounts for the wide range of price increases noted in the table.

Price Cutting—Dating back to the recession of 1954, price competition still is a factor in these industries. For at least one branch of the component industry—hydraulic equipment—there has been little or no increase. Some cylinder makers say they have had no price increase since 1950 and are not contemplating any now. One notes a 5-per-cent increase in July; another is reviewing production costs with a view to possible increases within the next month. Explanation: Boom growth has permitted cost absorption through increased production.

In other component areas where cost cutting has been a factor, price structures are stiffening. Early in the year, price warfare exsisted in the electrical controls industry. In the last three months, costs have risen for all makers, and some already have passed on increases averaging 10 per cent. Allis-Chalmers Mfg. Co. and Reliance Electric & Engineering Co. are among them.

Copper Factor—Electrical equipment makers have been plagued with increased costs not only in electrical sheet, castings and transportation but also in copper. General Electric Co. says it will up fractional horsepower motor prices 5 per cent in October. Jack & Heintz Inc., Westinghouse Electric Corp. and other makers, whose new labor costs are not yet fixed, are reviewing costs and probably will follow GE's lead.

In the gear industry, copper is helping stiffen up the price structure. Some bronze gears are up 18 per cent. Pyott Foundry & Machine Co. announces price increases ranging from 8 to 60 per cent. Cleveland Worm & Gear Co. has upped prices 10 per cent and says more may be in the offing on bronze gears if copper holds the present 43-cent level. Echoes are coming from nonferrous foundries, fastener makers and other copper users.

Outlook — Over the next four months, components costs will level out at an average close to 10 per cent higher than the pre-July figure. Price stability is likely after that—until 1956 labor settlements are made.

Central Cooling a Must?

Central residential air conditioning unit sales will increase nearly 1000 per cent in the next ten years, says General Electric Co.'s manager of marketing, J. H. Gauss.

Major reason: New homes being built with central air conditioning equipment. By 1965, reports Mr. Gauss, the home built without central air conditioning will be an exception.

BDSA Estimates Steel Requirements

(In millions of ingot tons)

	High Level Civilian Demand	Minimum Fixed Defense Margin	Required Capacity
1960	132	18	150
1959	129	18	147
1958	126	18	144
1957	123	18	141
1956	120	18	138
1955	117	18	135

Source: Business & Defense Services Administration

"More Steel Needed"—BDSA

BUSINESS & Defense Services Administration's Iron & Steel Division recommends that a steel expansion program with a goal of 150 million ingot tons by 1960 be encouraged through "accelerated amortization."

Thus, industry (see STEEL, Sept. 5, p. 41) and government agree that steel expansion is a must. The questions to be resolved are how much, when, and will the Office of Defense Mobilization agree with the BDSA recommendation for tax incentives.

The report recommends that a margin of at least 15 per cent over high level civilian demand is needed to insure a military "cushion." This minimum margin represents some 18 million ingot tons.

Current Status—Present capacity of the steel industry, says BDSA, is 126 million ingot tons. Civilian demand (see above) accounts for 117 million ingot tons. By adding the 18 million tons for defense requirements, the report shows that the U. S. already has a deficit of 9 million ingot tons.

Point to remember: Even if an immediate program were initiated to make up this deficit, the engineering, construction and break-in time would take from two to five years. On top of that, a cushion (the equivalent of 3 million ingot tons each year) is needed for growth in the civilian economy.

As shown in the table, the high level civilian demand for this year already is absorbing half the defense margin. By 1958, without expansion, the civilian demand will absorb present capacity.

Other Requirements — Metallics to produce such additional ingot capacity must be provided, explains the Iron & Steel division report. Iron and steel scrap will provide a portion, but pig iron will have to carry the major share of any expansion program. If ingot capacity increases by 24 million ingot tons by 1960, some 17 million additional net tons of pig iron must be made available, says the report. Some 12.5 million tons would be used for 52 per cent pig iron charge in the steel furnace. The balance is added for foundries and as a necessary safety margin to project the total ingot capacity of 150 million ingot tons. Technological advances, with their higher pig iron-scrap ratios, and the uncertainty of peak supplies of quality scrap, necessitate this safety margin, explains BDSA.

Accelerated tax amortization certificates for ore and coal mines, coking facilities, stone quarries and processing plants must be provided, says the report. Specific goals for such facilities can't be meaningful, but certificates for them can be granted in relation to individual programs which yield increased pig iron tonnages. Transportation, handling and storage facilities for handling steel materials must be considered for certificates, recommends BDSA.

Necessary, Too — The Iron & Steel division emphasizes that raw material installations and blast furnaces to supply metallics are an essential part of its recommended steel expansion program. "Additional ingot capacity," says the report, "is worthless without an increased metallics supply. The tremendous cost of raw material facilities and blast furnaces precludes any expectation that rapid tax amortization on steel furnaces alone would provide sufficient incentive to the industry to build all the ancillary facilities necessary to feed such steel furnaces."

Castings—Sufficient capacity for mobilization and civilian demand is available. The only area where expansion is needed is in large castings for direct military uses. This problem, states the report, is covered by an open expansion goal of 222,000 tons.

Republic Steel Corp., already has announced its expansion program, and it is anticipated that other primary producers will follow. The only question is: Will ODM provide additional incentive via rapid amortization?

ODM Grants Total $31 Million

Fast tax write-off certificates worth more than $1 million each went to three metalworking companies between Aug. 11-24. The Office of Defense Mobilization said the companies can amortize 45 to 80 per cent of their expansion grants.

Holley Carburetor Co., Warren Township, Mich. (jet engine controls), received a $2.11-million certificate with 45 per cent allowed for fast write-off; Oliver Iron Mining Division of United States Steel Corp., Mountain Iron, Minn. (taconite pelletizing facilities), got $1.56 million at 75 per cent; and Glenn L. Martin Co., Middle River, Md. (military aircraft), $1.49 million at 80 per cent.

ODM says that certificates totaling $31.17 million have been granted for 20,100 new or expanded defense facilities.

Industry Welcome

Former agricultural town wages successful campaign for manufacturing firms

"WHEN WE SAW Cedar Rapids, and what it had to offer, we knew we didn't have to look any farther."

That's the way Fritz Magin, president of Square D Co., describes his firm's decision to build a new plant in the Iowa city. It's not alone. Some 40 firms have moved in since World War II.

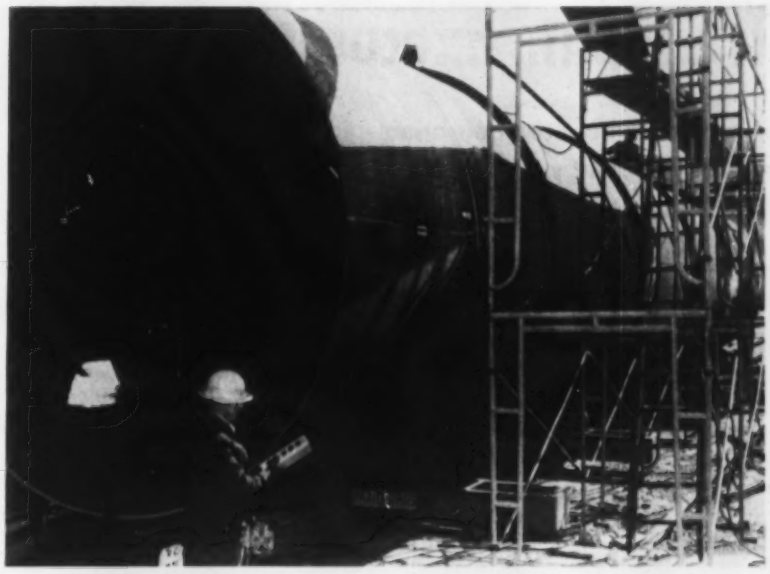
"We don't offer tax exemptions, free land or the like—and we are not seeking industries which are looking for them," says Robert H. Caldwell, executive vice president of the city's Chamber of Commerce.

The C of C does offer options on industrial sites to assure new industry a fair price on land. If city utilities are needed, it will supplement the city budget to get them to the site. The chamber tries to keep between 300 and 400 acres of good industrial sites available.

Advantages—Like most agricultural states seeking industry to diversify and "keep its young people home," Cedar Rapids offers a slightly lower labor rate than larger manufacturing cities. "But," town officials point out, "the price differential is not so important as the quality of the laborer. The educational level is considerably higher than in the city plants, too."

The Cedar Rapids Chamber of Commerce makes industry wooing a full-time job. It processes between 40 and 50 prospects a year and is constantly checking dividend statements of companies for possible clues to future expansion. Once a year it sends circulars to all the nation's industrial realtors. The chamber also scans business papers for possible clues and does a substantial amount of cold canvassing.

Most of Cedar Rapids' new industries have opened small plants which can be absorbed easily. Of the $40 million postwar industrial expansion in the city, 85 per cent has been within existing companies. Mr. Caldwell predicts: "We'll add at least 5000 new industrial jobs to our city in the next five years."



Rubber Tires Speed Fabrication of Cement Kiln

Variable speed welding turning rolls were used by the Shipbuilding Division, Bethlehem Pacific Coast Steel Corp., San Francisco, to make this 90-ton kiln. It's 78 ft long and 11 ft in diameter. The kiln section was assembled on the turning rolls. All longitudinal seams, circumferential butts, reinforcing and welding ring fillets were welded with the automatic submerged melt process. The rubber-tired rolls were built by the Pandjiris Weldment Co., St. Louis

Diecasters' Sales Spurt

Going for a record year in 1955, the diecasting industry will consume some 325,000 tons of zinc and 370 million lb of aluminum, says ADCI

NUMBER ONE CONCERN of the nation's diecasters: Will aluminum and zinc supplies keep pace with its industry's rapid expansion?

Discussion of this question highlighted last week's Chicago meeting of the American Die Casting Institute (ADCI). Members learned this: Supplies of zinc, at the current 13-cent price, should be adequate. Aluminum will continue to be tight.

Sales Results — Aluminum diecasting sales currently are running 75 per cent ahead of 1954 and 53 per cent ahead of 1953. Zinc diecastings are 54 per cent ahead of last year and 25 per cent over 1953's all-time high.

H. I. Young, president, American Zinc, Lead & Smelting Co., predicts that with Canadian and other imports, zinc supplies should hold up. Commenting on past zinc price fluctuations, Mr. Young offered this suggestion: Why not adopt a policy of pricing deliveries on the previous quarterly price averages? This would help solve the diecasters problem of contracting for future jobs without having any idea of what the price of zinc will be.

U. S. Controls?—In aluminum supplies, diecasters feel that there is a possibility that the government will limit the export of scrap and curtail the stockpiling program. Diecasters now get 85 per cent of their aluminum supplies from secondary smelters because of the price differential with primary ingot makers.

The biggest gains by the industry come not only in the auto market but in appliances, electronic components, business machines and air conditioners.

David Laine, executive secretary, ADCI, estimates that in 1957, some 500 million lb of aluminum will be used by diecasters. This total will be doubled by 1960, says Mr. Laine, if technological advances continue at a high level.

Trends in Executive Pay

Industry revises compensation plans to compete for top executive talent. Fringe benefits are in the spotlight, but good salary scale is still a must

REYNOLDS METALS CO. stockholders a week ago set aside 50,000 shares of stock. Reason: A stock option plan designed to hold top men with the company.

That action points up one of industry's biggest headaches: How to attract and hold key people, a problem expected to get worse before it gets better.

Motivation — One of the chief reasons executives change jobs is the lure of more dollars. A Booz, Allen & Hamilton survey of job-hunting executives ranks "higher pay" third (behind "bigger job" and "greater opportunity for growth") in motivating executive job changing.

The problem of executive pay is a knotty one. As one executive replied to STEEL's questionnaire: "If we knew the answer to the questions you propose, we would have a lot better executive compensation setup than we now have." His company is one of the top firms in its field.

Lagging—The general feeling is that executive pay is not keeping up with the climb in the pay of hourly rated workers. But concrete figures are hard to come by because executive responsibilities grow and shrink; job requirements and men change. A "guesstimate" puts over-all executive pay increases at about 4 to 5 per cent a year against about 7 per cent for hourly workers. In one company, the pay of hourly personnel is up 28.3 per cent since Jan. 1, 1952; executive pay hikes averaged 20.5 per cent.

Indication that the execs are catching up: Several companies report executive pay hikes have surpassed those of hourly workers.

Complicating the issue of adequate pay for management are taxes. Thus the spotlight on fringe benefits like stock options, pensions and company-paid insurance. They often mean more to a highly paid man than a substantial salary increase.

Combinations — The trend has been to use more varied forms of compensation for executives. It's continuing. Says the National Industrial Conference Board: "Recently, companies have stressed the value of 'manifold' compensation schemes. Those are combination plans that include base salary, profit sharing, cash bonus, stock purchase, life insurance and

Salaries of Metalworking Presidents

	1954	1951	1948
STEEL			
U. S. Steel Corp. Clifford F. Hood *Paid to Benjamin F. Fairless	$213,000	$261,000*	$207,900*
Bethlehem Steel Corp. Arthur B. Homer	487,347	375,544	263,280
Republic Steel Corp. Charles M. White	300,000	300,000	200,000
Youngstown Sheet & Tube Co. J. L. Mauthe *Paid to Frank Purnell	186,537	138,799	117,000*
Allegheny Ludlum Steel Corp. E. J. Hanley *Paid to H. G. Batcheller	123,000	95,000	125,000*
NONFERROUS METALS			
Aluminum Co. of America I. W. Wilson *Became president in April	200,000	113,200*	
Kennecott Copper Corp. Charles R. Cox	192,120	142,120	
Reynolds Metals Co. R. S. Reynolds Jr.	117,477	109,920	83,033
Bridgeport Brass Co. Herman W. Steinkrauss	112,500	113,528	81,000
TRANSPORTATION			
White Motor Co. Robert F. Black	120,000	122,885	98,000
Lockheed Aircraft Corp. Robert E. Gross	126,228	113,227	68,277
Diamond T Motor Car Co. E. J. Bush	60,080	48,100	60,080
AUTO SUPPLIERS			
Thompson Products Inc. J. D. Wright * Paid to F. C. Crawford	146,100	166,200*	125,000*
Kelsey-Hayes Wheel Co. George W. Kennedy	135,000	90,000	90,000
Houdaille-Hershey Corp. Charles Getler	70,000	70,000	70,000
Motor Wheel Corp. M. F. Cotes *Paid to J. E. Garlent	80,500	80,500*	60,000*
INDUSTRIAL COMPONENTS			
Timken Roller Bearing Co. William E. Umstattd	199,906	170,000	155,320
American Steel Foundries C. C. Jarchow *Paid to Thomas Drever	94,750	94,907	90,000*
Pittsburgh Forgings Co. Edwin Hodge Jr.	72,000	79,000	77,000
National Malleable & Steel Castings Co. Cleve H. Pomeroy	66,685	72,975	54,738
Standard Forgings Corp. Roy W. Clansky	56,095	56,085	45,160
Torrington Co. W. C. Thompson *Paid to L. J. Ross	55,417	47,000*	35,000*

Source: Securities & Exchange Commission

pension. A majority emphasize incentive features and deferred payments."

Their merits are disputed. Says one company president: "Certainly the trend is toward more fringe benefits for executives, with such fringes aimed at tax savings. Personally, I think they are bad and could be cured with a lessening of the confiscatory progressive rates of income taxation. When a good bit of executive pay is deferred, the executive tends to get frozen into his job; executive immobility is even worse than the immobility of hourly paid workers."

Decisions—Comments a financial executive: "Our company policy has been set on the idea that it is better to pay a man generously for his services over-all and let him decide the 'fringe benefits' or extra items he wants."

It's pretty much agreed that the cornerstone of a satisfactory executive pay setup is base salary. For that reason there is a growing trend toward formalizing salary administration for the upper echelons of managerial and professional employees. The Conference Board reports: "In ever increasing numbers, companies with position evaluation programs for the rank and file and first-line supervisors are extending the practice to higher levels. A few companies with no previous experience in position evaluation now use it for determining executive salaries."

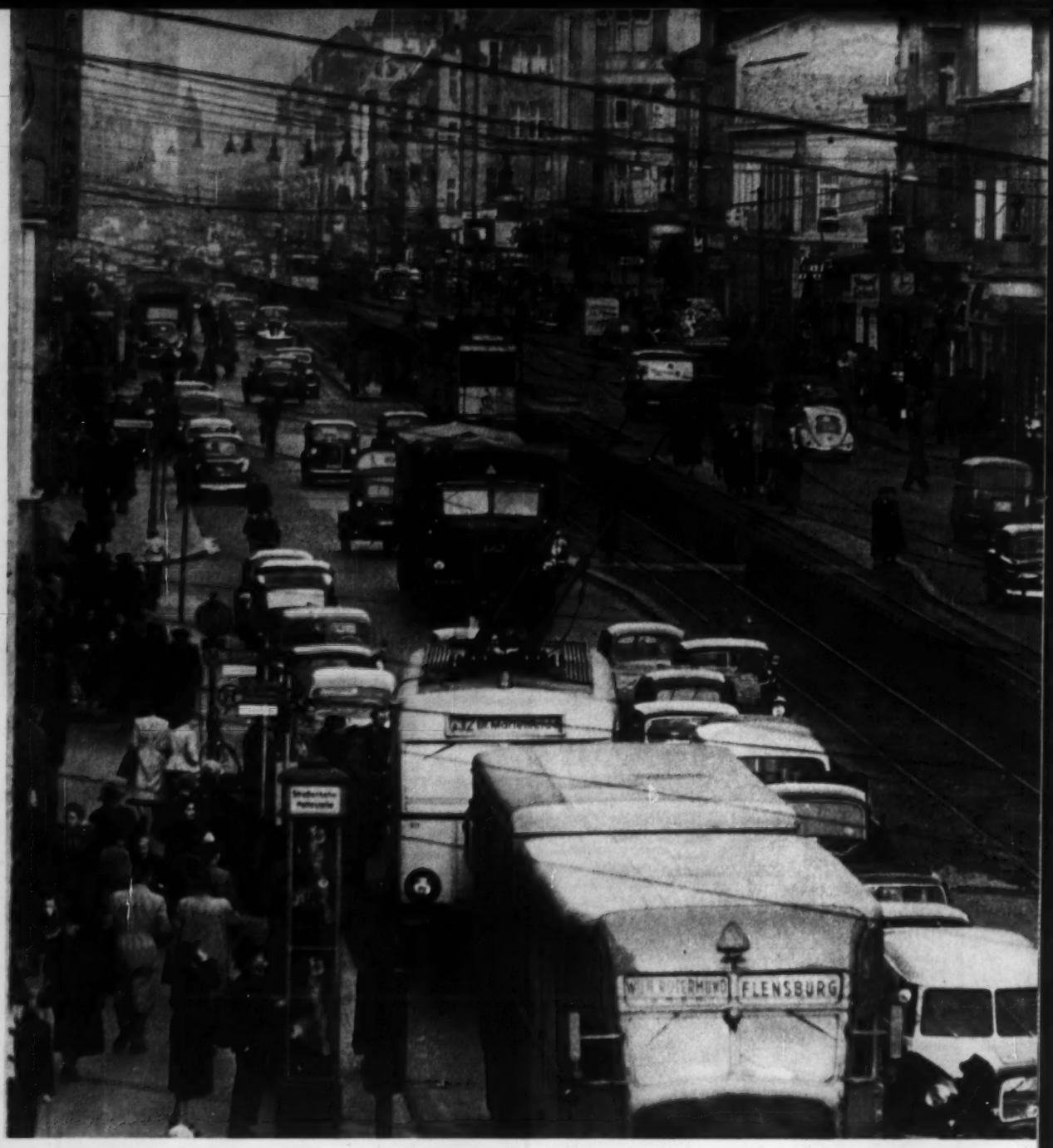
Practice—Again there are questions of merit. One executive rates such programs: "Better than nothing, but only slightly better." General practice seems to be to compare the company salary scale with those of competitors and similar businesses. Adjustments are made according to the company's own rates and a man's responsibility, capability and performance.

More companies are paying attention to salary surveys (such as the American Management Association's "Executive Compensation Survey"). One reason: When going into the market to seek new management talent, they frequently have to adjust existing executive salaries to be in line with what they had to pay the new executive. A side result of that is to tend to equalize executive compensation and to make it more consistent from company to company—but that's a still-developing trend.

Specials — Lesser fringe benefits, such as big expense accounts, special travel allowances and club memberships, get big publicity from time to time—they're much more the exception than the rule.

The sales department appears to make out best in this regard. General policy seems to be: A sales vice president might belong to a country club, with the company footing the bill. Another person whose job might be equally important (but of such a nature that a club membership would not be helpful to the company) would not be given this fringe benefit. Other companies give memberships to all top officers.

	1954	1951	1948
Lamson & Sessions Co.			
G. S. Case Jr.	46,488	40,950	41,060*
*Paid to R. H. Smith			
MACHINERY			
Combustion Engineering Inc.			
Martens H. Isenberg	99,258	131,250*	76,550*
*Paid to J. V. Santry			
Bullard Co.			
E. C. Bullard	79,853	49,465	42,400
Mesta Machine Co.			
Lorenz Iverson	60,900	60,900	55,000
McKay Machine Co.			
H. D. Miller	60,571	29,743	25,348
United Engineering & Foundry Co.			
Geoffrey G. Beard	55,300	75,450*	75,100*
*Paid to K. C. Gardner Sr.			
ELECTRICAL EQUIPMENT AND APPLIANCES			
General Electric Co.			
Ralph J. Cordiner	218,726		125,000*
*Paid to Charles E. Wilson			
Westinghouse Electric Corp.			
Gwilym A. Price	186,050		170,867
Square D Co.			
F. G. Magin	127,148	127,146	127,148
Minneapolis-Honeywell Mfg. Co.			
Harold W. Sweatt	125,000		90,000
Cutler Hammer Inc.			
G. S. Crane	89,736	66,626	52,750
Magnavox Co.			
Frank Freimann	75,000	62,500	65,000*
*Paid to Richard A. O'Connor			
Electric Controller & Mfg. Co.			
A. G. Patterson	32,375	44,400*	35,234*
*Paid to R. G. Widdows			
OFFICE EQUIPMENT			
National Cash Register Co.			
Stanley C. Allyn	240,000	242,645	155,166
Addressograph-Multigraph Co.			
George C. Brainard	116,666	142,090	141,900
Marchant Calculating Machine Co.			
Edgar B. Jessup	93,011	87,209	90,172
Smith-Corona Inc.			
E. L. Smith	60,900	75,600*	75,450*
*Paid to H. W. Smith			
FARM MACHINERY			
International Harvester Co.			
John L. McCaffrey	145,400	164,400	161,200
Oliver Corp.			
A. King McCord	71,250	69,400	85,000*
*Paid to Alva W. Phelps			
CONTAINERS			
American Can Co.			
W. C. Stolk	158,400	129,641	129,100
Continental Can Co.			
H. A. Eggerss	96,000	96,000	109,000
National Container Corp.			
Samuel Kipnis	50,140	50,160	50,140



Berlin: Showcase for the West

LOOK DOWN Schloss Strasse in West Berlin (above). Jammed with autos, trucks, busses and busy shoppers, it's the showcase for the Western World deep behind the Iron Curtain.

Then turn to Liepziger Strasse in East Berlin (opposite page). It is drab and empty.

Mart—Schloss Strasse is the new shopping center of West Berlin where its 2.1 million people can buy anything from tropical fruits to home appliances.

Liepziger Strasse was the fashion center of the prewar city. East Berliners (1.1 million) must queue up in front of the few government controlled stores for a limited selection of rationed goods. There are "free" HO stores, too, but prices are higher, and there's little to be had.

Red Loot—Before the Russians moved out of West Berlin in June, 1945, they had removed 80 per cent of the industrial equipment, 70 per cent of raw and finished materials.

Industrial production is back to 1936 levels, but for the Federal Re-

public of Germany it's double. So, the European recovery program continues for Berlin, and industry is getting a new shot in the arm through a 20 per cent tax rebate on corporation and personal income taxes retroactive to Jan. 1, 1955. A 4 per cent production tax on sales outside Berlin is eliminated. West German firms buying in Berlin also get a 4 per cent allowance.

U. S. Firms—Heinrich Walther, president of WEMA, an organization of 500 West Berlin metalworking companies, told STEEL that American companies are especially encouraged to set up Berlin operations.

Flohr-Otis, elevator builder with 800 workers, makes special tools for Otis, its affiliate in America. Adrena Werke, associated with Underwood, also has 800 workers. National Cash Register is reported considering a plant there.

Comeback—AEG and Siemens, big electrical equipment builders, were 100 per cent dismantled but are back with 15,000 and 20,000 employees, respectively.

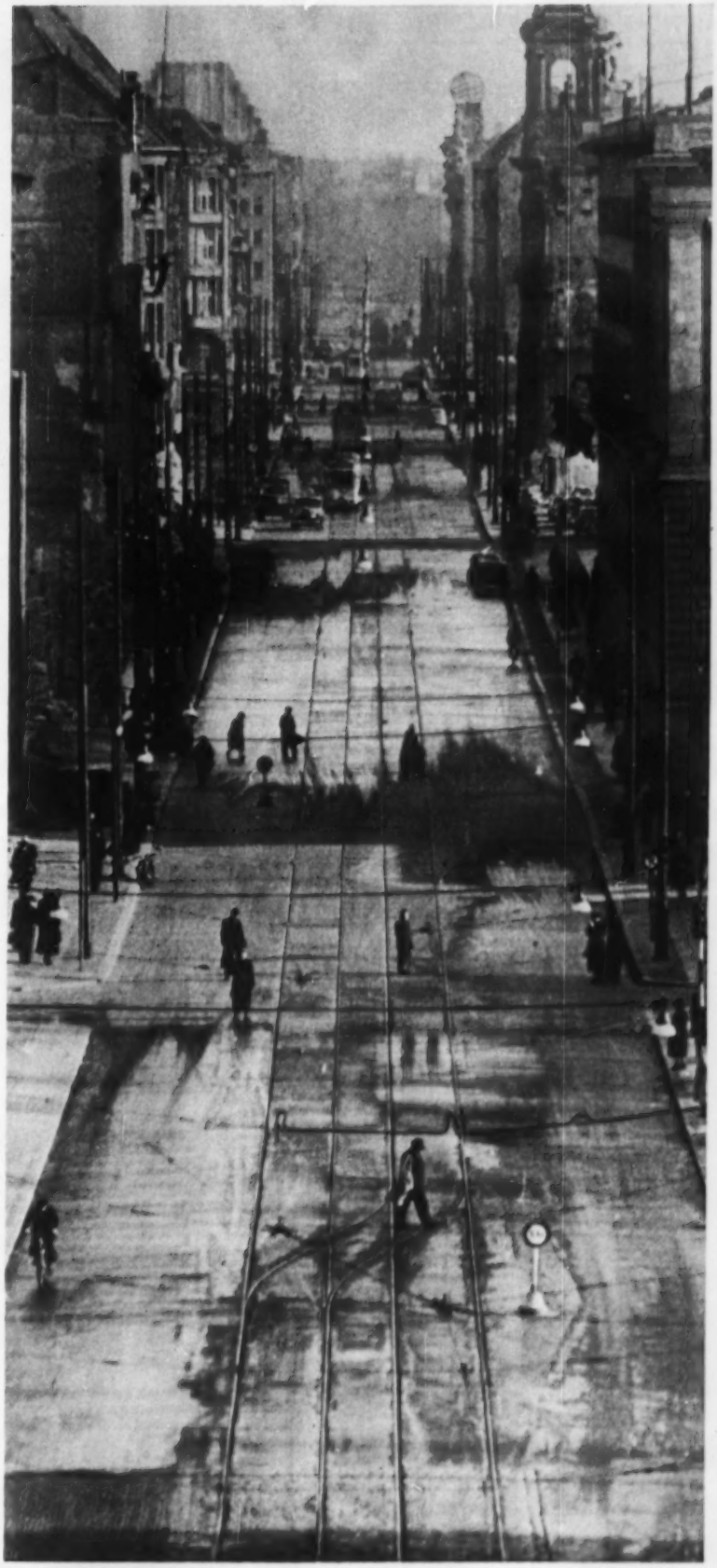
Askania-Werke A.G., precision instrument maker, had its plant completely stripped by the Russians. Now in operation with 1300 workers, President Herbert Hausmann says 700 more will be added. Askania has a new U. S. branch in Bethesda, Md.

Pee-Wee Machinen und Apparatebau again is building machine tools in a restored portion of its bombed out plant. Production will be increased when additional areas are restored, says President Werner Plagemann. The American licensee for its spline and gear rolling machines is Landis Machine Co., Waynesboro, Pa.

The Jobless—Unemployment in West Berlin has been sliced in half (to 150,000), but many skilled electrical, precision instrument and machine tool workers are looking for work.

Report on Europe

Back from a six-week tour of West Europe, STEEL's editor Irwin H. Such, reports his findings in this article, the third of a series.



By E. C. KREUTZBERG *Washington Editor*

The knight in shining armor for small business asks . . .

Why So Few U.S. Loans?

REP. WRIGHT PATMAN (Dem., Tex.) wants the Small Business Administration to issue more loans. As chairman of the House Small Business Committee, he is out to do something about it.

Mr. Patman's mid-year report points out that only 5085 of the 231,000 inquiries received by SBA in the first 21 months of its existence passed the agency's screening requirements and were converted into formal loan applications. Of the 5085 formal applications, 1141 were approved. Only 395 became direct loans, without bank participation—and Representative Patman says SBA has made disbursements in only 27 cases to date.

Statistical Review — Some 3.5 million firms meet SBA definitions of a small business. "Yet," he says, "the maximum amount of business loans which can be credited to SBA's activities over the last two years has amounted to only $1 out of every $1700 invested in new plants and equipment during this period. The maximum amount of business lending which can be attributed to SBA—including private funds—has amounted to less than one-half of 1 per cent of the total expansion in business debt during these years."

In his report, Mr. Patman made no comment about SBA's recent actions which eases its loan policy. Larger loans now are being negotiated in the field without reference to Washington. SBA also will consider a loan application after one bank has turned it down. Previously, it took two turndowns.

Complications? — Representative Patman actually is recommending that the government invest more money in private business. Washington observers feel that under such conditions government ownership of industrial facilities could develop. At least, they point out, it's reasonable to assume that as federal investment in industrial facilities (large or small) increases, its control over industry would become tighter.

Navy Rope Plant Lingers

Sen. Edward J. Thye (Rep., Minn.) is backing the administration in its fight to close a Navy ropemaking plant in Boston. As a member of the Senate Appropriations Committee, he points out that the action of the committee chairman Carl Hayden (Dem., Ariz.) is typical of the trouble the government is having when it attempts to get out of competition with private business. Senator Hayden is attempting to postpone action.

Foreign Trade: Problems

The Commerce department is proposing that it "predetermine" which federal contracts for heavy electrical equipment should be open for foreign bidders. If accepted, the proposal would call for the issuing of an executive order dealing with Buy American legislation prior to announcing contracts. Stiff opposition already is being heard, particularly from the agencies concerned with offshore procurement under the Buy American legislation. General feeling: Foreign bidders will misunderstand, and it would be too difficult to administer.

Meet John L. Cross: He's the new director of the Electrical Equipment Division, Business & Defense Services Administration.

Mr. Cross is on leave from Westinghouse Electric Corp., where he is manager of power equipment sales for the transformer division. He may be contacted in Washington by calling Sterling 3-9200, Ext. 2175.

AEC Lifts Export Controls

Export licensing controls involving certain electrical, industrial and scientific instruments and equipment have been lifted by the Atomic Energy Commission. The items include radiation detection and measurement instruments, mass spectrometers and mass spectrographs, large vacuum diffusion pumps and certain types of electronuclear machines. Ironic twist: The Bureau of Foreign Commerce will institute export licensing controls on most of these items due to "their potential strategic applications."

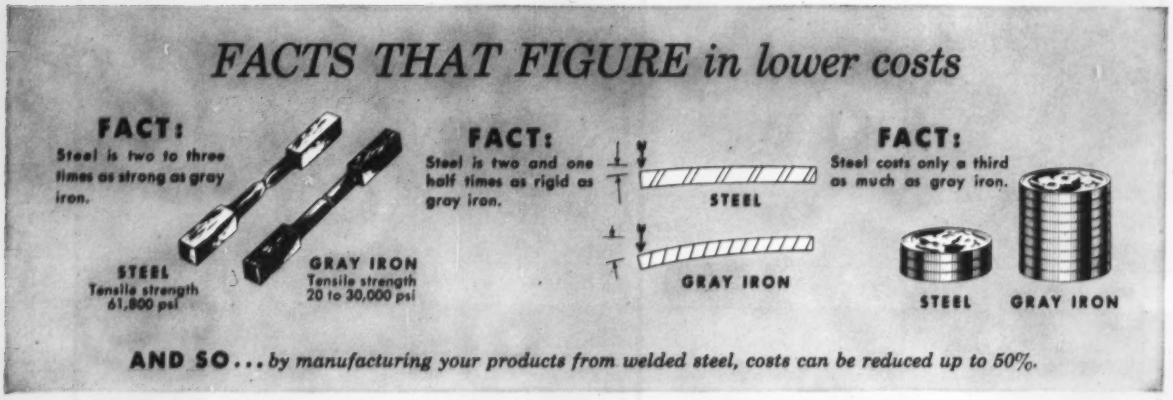
Here and There

With the co-operation of industry, the Bureau of Mines has launched a research program to determine the feasibility of utilizing bacterial action in recovering such metals as nickel, cobalt, tungsten and manganese from low-grade ores . . . The Federal Communications Commission is liberalizing its rules governing special industrial radio service . . . And Rep. John D. Dingell (Dem., Mich.), a member of the House Ways and Means Committee, will fight for the repeal of remaining wartime excises, some relief for all taxpayers (emphasis on the low-income brackets) and for corporate income tax rates to be restored to the pre-1951 level . . . The Navy announces that all new Navy fighter aircraft are being fitted with gear which permits refueling in flight and that an undisclosed number of carrier squadrons are already equipped with this gear.

MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.

ROLLING MILLS • MORGOIL BEARINGS • WIRE MILLS • REGENERATIVE FURNACE CONTROL • EJECTORS • GAS PRODUCERS

H. H. Wood, Rep., Koppers Bldg., Pittsburgh, Pa. *English Rep.*, International Construction Co., 56 Kingsway, London W. C. 2, Eng.


FACTS THAT FIGURE in lower costs
FACT:
Steel is two to three times as strong as gray iron.
STEEL
Tensile strength 61,800 psi
GRAY IRON
Tensile strength 20 to 30,000 psi
FACT:
Steel is two and one half times as rigid as gray iron.
STEEL
GRAY IRON
FACT:
Steel costs only a third as much as gray iron.
STEEL
GRAY IRON
AND SO... by manufacturing your products from welded steel, costs can be reduced up to 50%.

How this locomotive manufacturer proved that

WELDED DESIGNS WEIGH LESS—COST LESS

WEIGHT CUT 25%

Weight of a cast steel generator armature spider was cut 25% by redesigning for welded fabrication. With welded design, sections made of mild-steel plate are thinner with ample strength to meet all requirements. Balancing is simplified by uniform distribution of metal.

COST IS LESS

Because the weldment is produced much closer to the finished size, machining costs are reduced. Lighter weight of the spider results in a substantial savings in material costs. Concentricity of the weldment surfaces lead to longer tool life.

How you can cut costs...NOW

Because steel is stronger, more rigid than iron, yet costs a third as much per pound, costs on many products can be cut as much as 50%.

You can realize such savings on your designs, on products you manufacture, without disrupting production. Simply change over your designs one part at a time.

A Lincoln representative will gladly work with you to simplify designs and cut costly production manhours.

WELDESIGN MANUAL

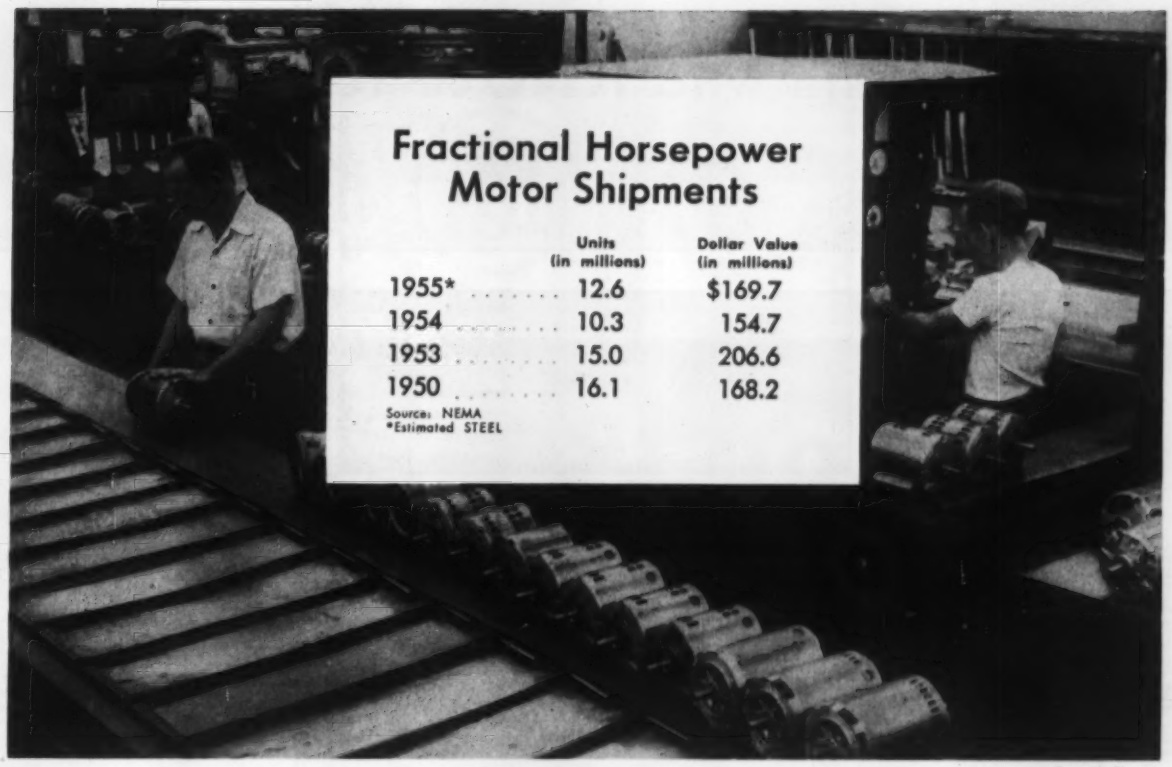
shows how to convert designs to welded steel with minimum design time. Available to product engineers and designers at nominal cost. Write today.

Longitudinal butt welds are made on armature spiders with Lincolnweld using mild steel L-60 wire of 5/32" diameter and Number 780 agglomerated flux. Two passes fill the V-groove produced by scarfing the ends of the plate where they are joined.

THE LINCOLN ELECTRIC COMPANY

Dept. 1609 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment



Fractional Horsepower Motor Shipments

	Units (in millions)	Dollar Value (in millions)
1955*	12.6	$169.7
1954	10.3	154.7
1953	15.0	206.6
1950	16.1	168.2

Source: NEMA
*Estimated STEEL

General Electric

Fractional Motor Sales Regenerate

"BETTER THAN 1954, but not a record year," is the prediction for fractional horsepower motor shipments (see table).

First half results, reports the National Electrical Manufacturers Association, show that 6.3 million units ($89.8 million) were shipped, which compares with factory sales of 5.5 million units ($84.1 million) during the first half of last year.

Top Consumer—With close to 70 per cent of fractional horsepower motor production going into home and related requirements, the continued high rate of home construction is a bright spot for the industry. The average American home has at least six fractional motors—in the refrigerator, washing machine, vacuum cleaner, furnace, food mixer and fan. Industry spokesmen point out that homes under construction are using at least a dozen motors and that modern homes ten years hence will have almost twice as many fractional units.

While the industry may not have a record year, J. F. Farrell, sales manager, industrial motor department, Westinghouse Electric Corp., says: "We expect 1955 to be the best year since the end of World War II in the appliance and industrial fractional horsepower motor fields and that the current high rate of activity will extend well into 1956."

Sales, Prices—Over-all industrial requirements are steady, and there may be added gains registered in the fourth quarter as excess stocks, in most cases, have been depleted. General price rises will be introduced during the last part of this year, too. H. A. MacKinnon, vice president and general manager of the component products division, General Electric Co., says: "We will increase prices on fractional horsepower motors approximately 5 per cent, effective Oct. 3. The price advances are necessitated by increased wages and higher material and transportation costs."

Future—The increasing trend toward more automation is calling for a sharp rise in the demand for fractional motors. Air conditioning requirements also will help bolster future sales.

The independent motor producers are particularly optimistic about opportunities for special-purpose fractional motors. Traditionally, this is a market where they have made their greatest gains.

Only cloud on the horizon: Tightening deliveries on steel and an increasing scarcity of copper.

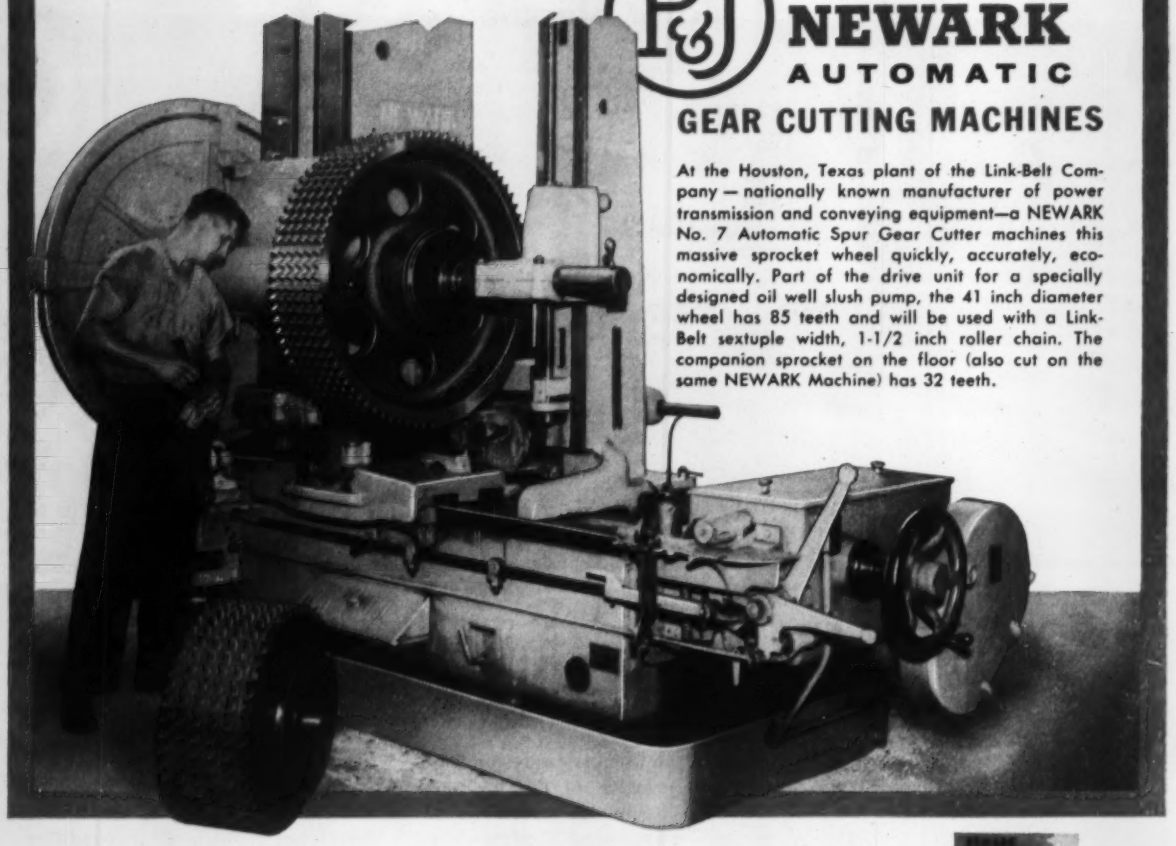
Taxi Meter Flags Flip Up

Electric taxi meters are ticking off new sales gains, according to Ralph K. Ulrich, sales manager, Register Division, Rockwell Mfg. Co., Pittsburgh.

Introduced in 1954, electric meters are rapidly replacing mechanical models, some of which have been in use more than 30 years.

Specialists who KNOW rely on

P&J NEWARK AUTOMATIC GEAR CUTTING MACHINES



At the Houston, Texas plant of the Link-Belt Company — nationally known manufacturer of power transmission and conveying equipment—a NEWARK No. 7 Automatic Spur Gear Cutter machines this massive sprocket wheel quickly, accurately, economically. Part of the drive unit for a specially designed oil well slush pump, the 41 inch diameter wheel has 85 teeth and will be used with a Link-Belt sextuple width, 1-1/2 inch roller chain. The companion sprocket on the floor (also cut on the same NEWARK Machine) has 32 teeth.

POTTER & JOHNSTON - NEWARK

Assets of the Newark Gear Company have recently been acquired by **POTTER & JOHNSTON**, subsidiary of Pratt & Whitney, Division Niles-Bement-Pond Company. In addition to the complete line of P&J Automatic Turret Lathes, these long-famous automatic gear machines are now being manufactured in our Pawtucket, Rhode Island plant, and are made available through Pratt & Whitney factory-direct representatives.

SEND NOW FOR COMPLETE INFORMATION

P & J NEWARK Automatic Gear Hobbers and Spur Gear Cutters produce helical and herringbone gears, worm wheels and spur gears accurately and economically; they are easy to set up and operate. Several models are manufactured to handle a very wide range of work requirements. Product literature—including complete specifications and engineering data—is yours for the asking. Write on your Company letterhead direct to Pawtucket outlining your requirements . . . or simply phone the Pratt & Whitney Branch Office nearest you.

POTTER & JOHNSTON CO.

PAWTUCKET, RHODE ISLAND

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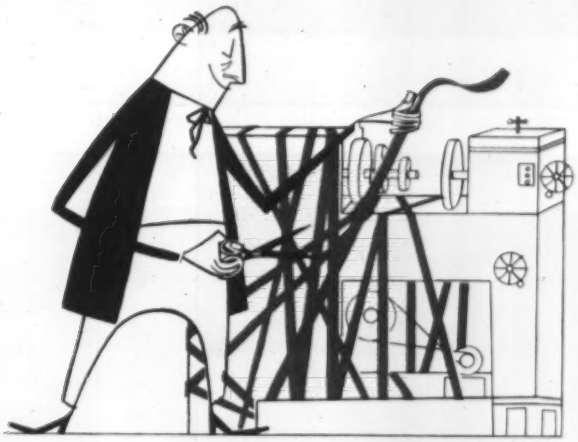
BRANCH OFFICES: BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST. LOUIS **EXPORT DEPT.**, PAWTUCKET, RHODE ISLAND. **AGENT:** HOUSTON, WESSENDORFF, NELMS & CO.

PRECISION PRODUCTION TOOLING FOR MORE THAN FIFTY YEARS



U.S. states—maybe overstates—ils tax stand on rentals as . . .

IRS Tightens Up on Leasing

LOOK FOR a court case to test the Internal Revenue Service's new definition of leases and conditional sales.

That's the opinion of experts studying IRS Bulletin No. 35, the long awaited statement of the service's position on tax aspects of the matter. The IRS view is important because if a "lease" is ruled a conditional sale, tax postponement advantages of the "lease" disappear. Despite capital equipment makers' warnings that tax aspects of leasing were obscure, some lessees have gambled on a favorable ruling.

Losers?—They may lose. The IRS promises to be stricter in its interpretation of a conditional sale. The service says that there are no general rules, and that each case must be decided on its particular circumstances. It warns that a transaction can be treated as a sale, rather than a lease, if one or more of these conditions is present:

When portions of the payments are made applicable to an equity to be acquired by the lessee.

When the lessee will acquire title on payment of a stated amount of rentals.

When the total amount that lessee is required to pay for a short period of use constitutes a large portion of the total sum required for transfer of title.

When rental payments materially exceed fair rental value—this may indicate payments include an element other than compensation for use.

When property may be acquired at a price which is nominal in relation to its value at the time when the option is exercised, as determined at the time of the original agreement, or which is relatively small when compared with total payments required.

When some portion of periodic payments is specifically designated as interest, or is otherwise readily recognizable as the equivalent of interest.

Rentals—Agreements usually are indicative of intent to rent if payments are at hourly, daily or weekly rates, or are based on production or use. They are not related to normal purchase price. If there is an option to purchase, the price approximates anticipated fair market value on the option date.

Case No. 1—IRS says it would consider as a lease those short-term agreements usually concerning mobile or small equipment when compensation for use customarily is expressed in terms of hourly, daily or weekly rental. Rental rates usually are high in terms of equipment value. There may be an option to buy the equipment at a price fixed in advance. This price approximates the fair market value of the equipment at the time the purchase option is exercised. Repairs, maintenance, taxes and insurance are obligations of the lessor.

Case No. 2—IRS also would rule as a lease those agreements entered into by firms engaged in the business of leasing. Their rental rates must be based on normal operations or use, plus a surcharge for operations in excess of normal. If the agreement includes an option to purchase, the price has no relation to rentals paid.

Case No. 3—But here's a situation which IRS warns it usually will rule as a sale: The "rental" is for a relatively short period. It covers the purchase price, plus interest. The title passes to the lessee on payment of a stated amount of rental, or, on termination of the agreement, upon added payment that brings total payments up to the purchase price, plus interest.

Case No. 4—And here's another one that the service says usually will be considered a sale: The agreement provides for payment of rental for a short term, with provision for continued use over substantially all the remaining machine life. During the initial term, the rental approximates the normal purchase price, plus interest, when rentals during the renewal are "insignificant" compared with the initial rent. The contract may or may not provide for an option to acquire legal title upon termination of the initial period, or at any time thereafter.

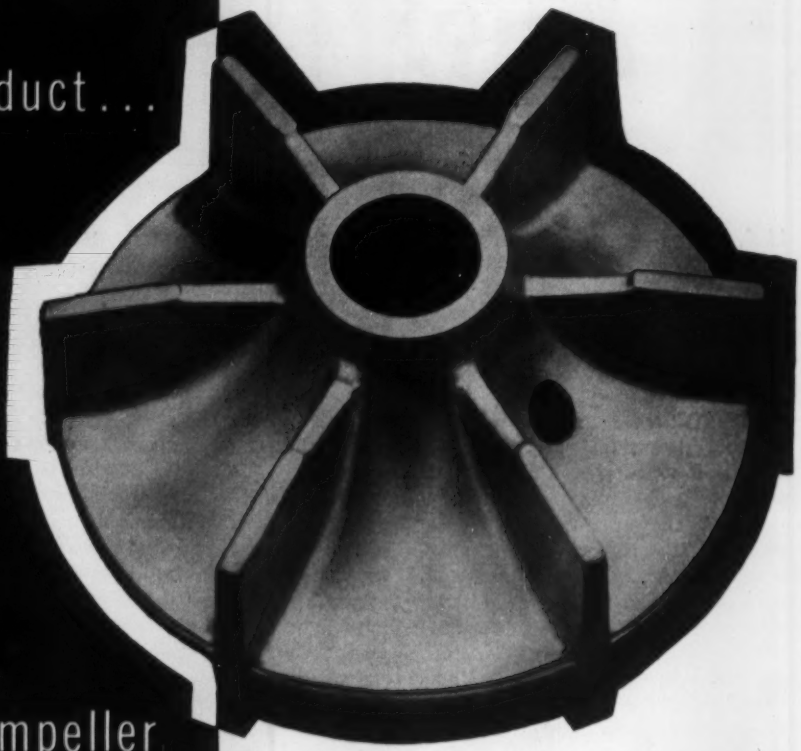
IRS adds that it will also usually consider a variation on Case No. 4 as a sale. That's when the equipment manufacturer purports to sell its "lease" to a credit or finance company.

The Effects—What will be the results of Bulletin 35?

"If the IRS definition of a conditional sale holds up in the courts," comments one observer, "the short lease of three years or less is probably finished because its chief reason for being is the tax angle."

However, the majority of recent capital equipment leases have been made for five-to-seven-year periods. And the majority of leases have been made because of the low initial capital investment needed for the user, not because of tax angles.

another case where
MUELLER BRASS CO.
FORGINGS
improve a product...



diesel engine
water pump impeller
forged of **"603" HIGH STRENGTH BRONZE**

Formerly produced as sand castings, these impellers now give better results because they're forged from "603" high strength bronze by the Mueller Brass Co. Said to be "right for the job and far superior to the old cast impellers", these forgings bring greater efficiency and longer life to the diesel engine water pumps in which they are installed. This tough "600" series alloy is readily forgeable, possesses remarkable resistance to corrosion, and has fine bearing qualities. Uniformity is excellent, due to the closer dimensional control of the forging process, and surface finish is noticeably smoother. This is another case where Mueller Brass Co. forgings have greatly improved a product . . . why not let our engineers show you the many advantages of using forgings.

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PORT HURON 19, MICHIGAN

Subcontractors for U. S. Aircraft:

State Leaders		Foreign Leaders	
California	10,314	England	38
Ohio	4,487	Canada	37
New York	3,382	Germany	7
Texas	1,615	Switzerland	7
Connecticut	1,513	France	5
Illinois	1,433	Denmark	2

Source: Aircraft Industries Association

Consolidated Vultee Aircraft Corp.

There's room for low-bidding, quality partmakers as . . .

Aircraft Firms Check Cost

IT TAKES some 50,000 first-tier subcontractors and suppliers in the U. S. and abroad to keep America air-borne.

A survey of 35 major aircraft manufacturers (20 airframe, 8 aircraft engine and 7 major component and accessory producers) by the Aircraft Industries Association reveals that 41,700 suppliers employ less than 500 workers.

Outlay—Primary producers estimate that during fiscal 1954 they spent $4.8 billion with subcontractors and suppliers. Small business firms (less than 500 employees) got $2.3 billion of that.

The 48 states and 18 foreign nations are represented in the list of subcontractors and suppliers. California leads the domestic aircraft parade (see table) with 10,314 companies contributing products or services. England is the foreign "kingpin," having 38 firms supplying U. S. aircraft needs.

Status—The AIA survey shows: Reduced military requirements are making for less available business, but there is an abundance of orders for companies combining low bids with quality products or service. This is a radical change from the war years when the ability to produce "quantity" overshadowed cost.

Sales returns for this year, says AIA, will be over $2 billion, including the totals registered by second, third and fourth-tier subcontractors and suppliers—1956 totals may decrease slightly.

Point of interest: Owing to the complexity of modern aircraft manufacture, no single company undertakes the task of producing the entire product.

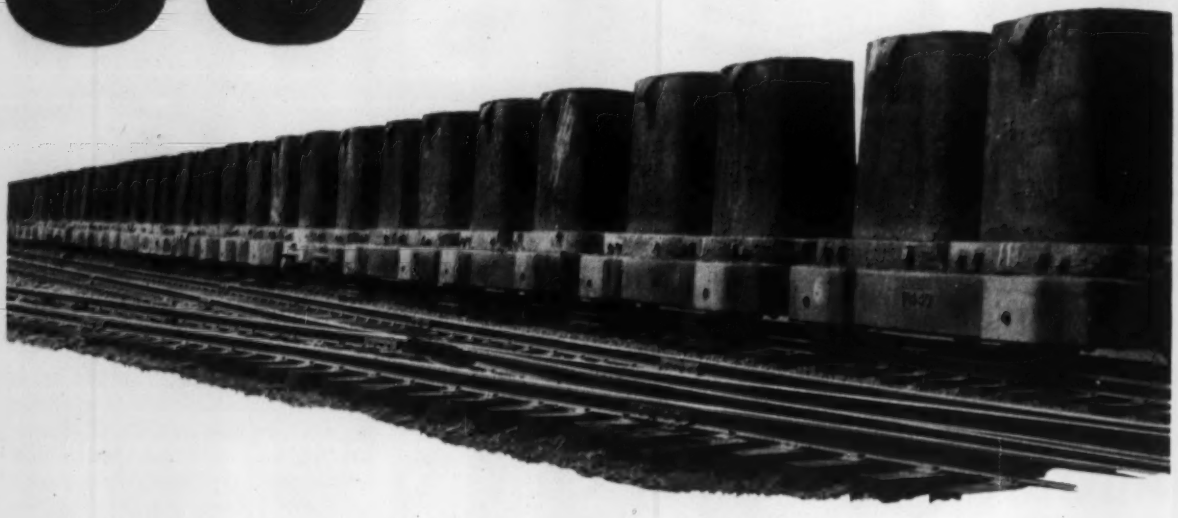
Problems—To break into aircraft subcontracting, your production methods must be flexible, and you must have gages and other precision measuring instruments necessary for inspecting and testing each component. Most have trouble keeping adequate facilities for heat treating, plating and anodizing. To assure compliance with government regulations, the services of aeronautical, chemical and electrical engineers often are needed. These requirements often make submitting the "low bid" a difficult proposition.

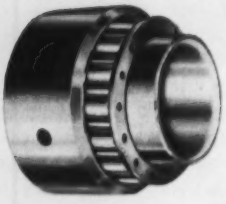
Primary producers have elaborate procedures and programs for locating and utilizing the productive capacities of subcontractors and suppliers. Teams of engineers, materials, production and tool men comb the country for the right company to do a particular job. They help the subcontractor determine the types of work they are capable of doing and help solve many of the problems arising from change-overs in facilities.

Future—Some aircraft subcontractors and suppliers will fall by the wayside during the coming year, AIA believes, but there still is an "unlimited ceiling" for the company that can produce a quality product or superior service—competitively priced.

86% OF ALL INGOT CARS ROLL ON RUGGED HYATTS

at the Indiana Harbor Works of Youngstown Sheet and Tube





In this great mill, *as throughout the steel industry*, HYATTS are far and away the *preferred* roller bearings for ingot cars.

Why this overwhelming preference? There are six sound reasons:

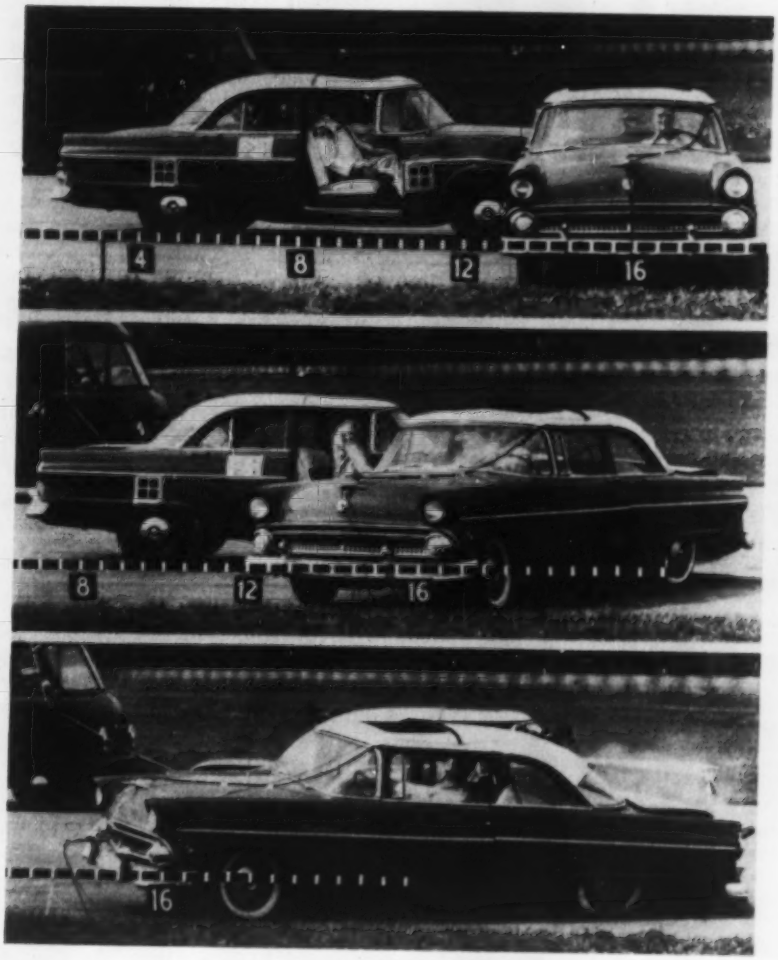
1. HYATTS greatly reduce friction and starting power requirements
2. HYATTS permit longer trains, faster and smoother car spotting
3. HYATTS perform dependably despite constant heating and cooling, abrasive dirt, and pile-driver shocks when ingots are pounded free from the molds by the stripper
4. HYATTS' straight cylindrical design permits lateral expansion without cramping rollers
5. HYATTS provide ample reserve for overloads
6. HYATTS virtually eliminate costly downtime

If you want bearings that can *keep on taking* the most brutal kind of punishment—*can keep your production rolling profitably*—standardize on HYATTS throughout your mill!

HYATT ROLLER BEARINGS

STRAIGHT ○ BARREL ○ TAPER ○

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY



Automakers crash their cars for scientific data as . . .

Detroit Starts Safety Race

AUTO PUBLIC RELATIONS men view safety in somewhat the same way a politician views babies. For that reason, it's easy to conclude from recent Motor City releases that safety has just been invented in Detroit.

But in spite of charges to the contrary, automakers have been safety conscious for some time.

Basically, the new drive amounts to a shift in emphasis. Up until now automakers have concentrated most prominently on reducing the likelihood of accidents. Now they're taking a closer look at what happens to passengers in an accident.

Source — The latest chapter in the automakers' continuing efforts to make their products better begins with a report by Hugh Dehaven on "Mechanical Analysis of Survival in Falls from Heights of 50 to 150 Feet." It was printed in the publication *War Medicine* in July, 1942.

Dehaven studied records of suicide jumps and accidental falls, looking for answers to a double-edge problem: First, he wondered what conditions existed that permitted certain people to survive extremely severe falls when common sense said they should have been killed. Second, was it possible to duplicate these accidentally present conditions in the design of aircraft and motor vehicles?

Until Dehaven's studies, stories of freak survivals had been just horror material for the Sunday supplements, but Dehaven demonstrated that sound research could convert this material into scientific data which could be used in reducing accidental injury. He set forth two basic conclusions:

Soft Falls — First, survivors struck in a position that spread the force of the fall over a large body area. Secondly, their fall ended in an environment which would yield to the impact and in yielding would absorb force.

The government was interested. During the war, it was confronted with the loss of aircraft and highly trained and skilled personnel in crashes. A government-sponsored crash injury research project was installed at Cornell University Medical College.

Literally, the crash injury group was investigating the package that contained these flyers; the kind of damage that package might be expected to withstand; and the kind of damage that might be incurred by the flyers while they were in that package. Evidence was found that the human body can sustain 50 to 150 G peak loads without serious injury if the duration of this force was not too great. Endurance of this high level of force depends upon its proper distribution.

A third hypothesis was added later: The rate of the onset of force must remain within certain limits if the human is to survive.

Waiting Period—For about ten years, this method of investigation (the correlation between damage to structure and the production of injury) was confined to aviation. The findings were applied in aircraft design, and injuries in military aviation crashes dropped an incredible 500 per cent.

Late in 1951, the armed forces

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A 167-lb wood block simulating the body of a driver is shown as it crashes into a 1956 Ford steering wheel, which embodies the concept of packaging the passenger

investigated the same problem in the motor vehicle field. More man days of service were being lost from automobile injuries than from any other single cause, including combat.

Toll—The Navy reported that combat put 8700 people in the hospital. Of these, 50 per cent went back to duty in 24 hours. During the same period, 8486 Navy people went to the hospital due to automobile accidents. They stayed there an average of 46 days each.

Other figures show the dimensions of the problem among the civilian population. Of all causes of accidental deaths, motor vehicles provide the largest single group of fatalities, topping falls, fires, drownings, aircraft, rail and water transportation accidents. Normally, about 34,000 persons die in auto accidents every year.

This does not mean there has not been improvement. The rate of accidents per millions of miles traveled has declined steadily for years. Beween 1930 and today, there has been a 60 per cent drop in the fatality rate.

Special Case—But the problem of auto fatalities and injuries still confronts the medical profession. This is a medical problem peculiar to our nation and our way of living. Like it has attacked epidemics in the past, the medical profession is determining the facts, analyzing the data and working toward utilization of the information.

The big bulk of the data is coming from the highway patrols of seven states. Detailed reports on the nature of the accidents, injuries to occupants and their evident source are being sent to Cornell University Medical College.

The Facts—In cases analyzed, 26 per cent of the occupants were not injured; 45 per cent sustained slight injuries; 14 per cent were moderately injured and 10 per cent suffered injuries ranging from serious through critical. "Fatals" were only 5 per cent of the cases in which someone in the car was injured. In other words, 95 per cent of accident victims survive, although 24 per cent sustain moderate through fatal injuries.

As to areas of the body injured, head and facial injuries are sustained by 73 per cent of those injured; chest injuries are sustained by 37 per cent; and the lower portions of the body are damaged in 47 per cent of the cases. These percentages add up to more than 100 because of multiple injuries.

To package human bodies effectively against collision, it is important to know what happens to the body when force is delivered and what happens to the car leading to the injury. From statistics gathered by Cornell several important facts have been learned. For example, when front doors pop open, 26 per cent of occupants are thrown out of the car. Ejection from the car more than doubles the risk of moderate through fatal injuries. Contrary to the theory that it is best to be "thrown clear," these findings indicate that your chances of avoiding severe injury or death are better (2 to 1) if you stay in the car.

Coming Out—Keeping people in the car is the major area of progress in injury prevention. New latches to prevent doors on 1956 cars from opening under impact will be announced by all makers. Seat belts also were released by alert automakers on the strength of this data and on studies which showed there is no correlation between the use of seat belts and internal injuries. Many fleet drivers are being provided with belts and instructions to use them at all times.

Other injury reducers becoming available are padded dash boards and headers and drop-center steering wheels. Today's plastic wheels are designed to collapse on impact rather than shatter like the old wooden wheels; drop-center wheels have been available for some years.

Prospects—The public has suddenly become aware of the fact that injuries in auto accidents can be reduced. With that kind of an audience, automakers will start bringing into the forefront the testing they have been doing many years.

Materials and engineering should get a workout, and while it's unlikely that cold rolled will be ordered by SAE crumple rate, structures undoubtedly will move toward better stressing, which could reflect in metal consumption. If you've got an idea for a safety device, your chances of getting a hearing in Detroit are bound to be improved in the safety-race climate. Most important, your own car will be safer for you.

Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994	676,269
May	913,257	621,318
June	825,031	635,540
July	815,061†	543,344
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,896,678

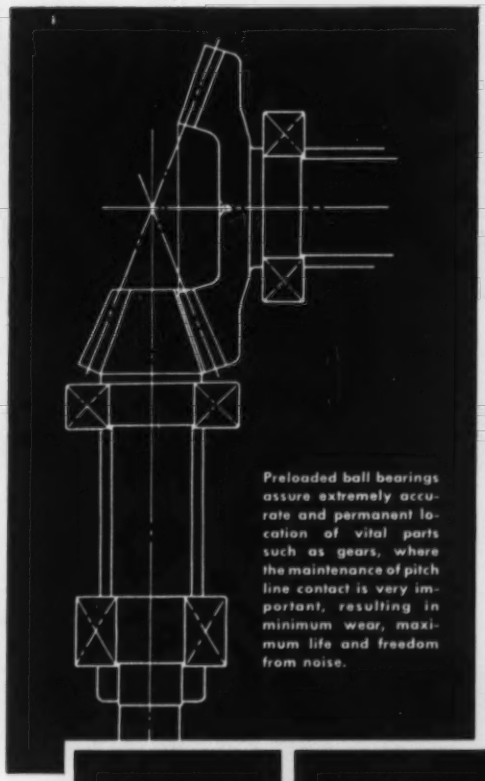
Week Ended	1955	1954
Aug. 13	175,822	119,208
Aug. 20	165,094	121,736
Aug. 27	155,233	113,496
Sept. 3	105,680	110,995
Sept. 10	99,563†	84,743
Sept. 17	110,000*	74,026

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

FACTS

about

NEW DEPARTURE
BALL BEARINGS



Preloaded ball bearings assure extremely accurate and permanent location of vital parts such as gears, where the maintenance of pitch line contact is very important, resulting in minimum wear, maximum life and freedom from noise.

How Preloading Pays Off in Accuracy!

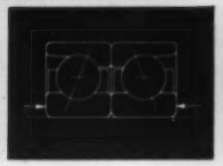
New Departure pioneered preloading to give you a new measure of machine accuracy! This accuracy, due to increased bearing rigidity, pays off in high-precision machines, where the slightest deflection caused by work loads on moving parts can be crucial to the ultimate performance of the machine.

By placing a predetermined internal load on the bearing, either at the time of manufacture or at installation, deflection due to the work load is greatly reduced. This means not only that machine accuracy is greatly improved, but that the ball bearing characteristics of low torque operation and long life are fully retained.

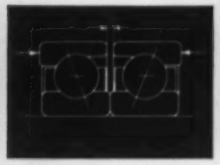
If you are seeking a solution to your bearing problem, call on New Departure for the answer. You will benefit from more than 50 years' experience in bearing design, testing and manufacture.

Send for Booklet BA-17 on ball bearing application

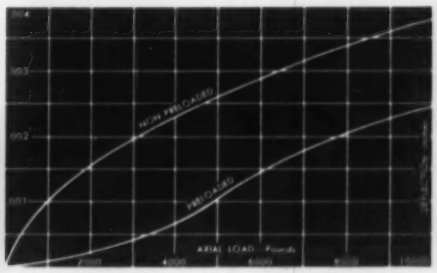
Preload is predetermined, then accurately obtained by grinding Duplex bearing faces so that an exact and fixed compression will take place when mounted.



A Duplex bearing, in effect, becomes a preloaded double-row bearing capable of holding parts within close limits, both radially and axially.



Duplex bearings may be mounted in several different ways to suit load conditions. In each case, extra rigidity of shaft centering is obtained by preloading.

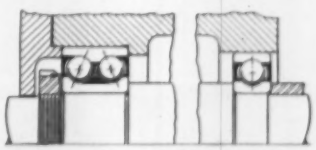


The benefits of preloading can be seen from this deflection curve. The double-row ball bearing referred to here is the most rigid type of unit bearing made to resist loads from any direction.

Typical Application of New Departure Preloaded Ball Bearings

The extreme resistance to deflection and the freedom from wear offered by the New Departure double-row bearing make it a favorite wherever exact location of parts under combined loads must be assured not only initially, but throughout long usage.

In this typical application the double row, solidly supported against suitable housing and shaft shoulders and with a "floated" single row at the other end, provides one of the best general-duty mountings where considerable thrust is present.



NEW DEPARTURE • • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

There's one right way to buy pressure tubes—it's tube life per dollar: *Ask the experts!*

This month's report is on:

DM STEEL

Has unusually high creep strength for a pearlitic steel, good stability up to 1200°F., fairly good corrosion and oxidation resistance. Has 2 to 3 times the life of carbon steel where corrosion is not severe. Recommended for cracking furnace tubes, hot oil lines, superheater tubes, high temperature steam piping and forgings for accessory parts.

ONE OF 24 TIMKEN HIGH TEMPERATURE STEELS

Carbon	Sicromo 2	Sicromo 5S	18-8 Ti
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	16-13-3
DM-2	2½% Cr.-1% Mo.	Sicromo 7	25-20*
Silmo	Sicromo 3	Sicromo 9M	25-12*
DM	4-6% Cr.-Mo.	18-8 Stainless	35-15**
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	16-25-6**

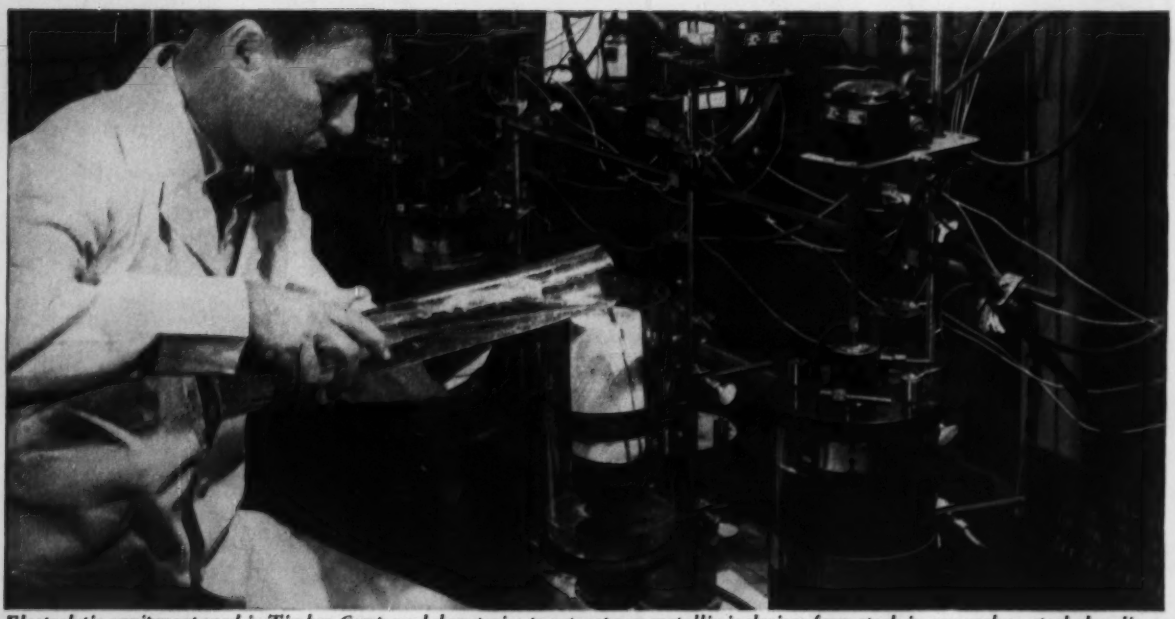
*Available as seamless tubing on an experimental basis only.
**Not available as seamless tubing.

YOU'RE fortunate in having the Timken Company's large choice of high temperature tube steels that will solve your heat, pressure, corrosion and oxidation problems. You're even more fortunate when you choose the *one* analysis that will give you maximum tube life per dollar—the only true index to actual tube steel cost.

To find it, *ask the experts!*

These experts are the metallurgists of The Timken Roller Bearing Company. They'll put their more than 20 years of steel research and experience—with emphasis on high temperature steels—at your disposal. Help you select from 24 different analyses the one tube steel that will give you the best life/cost ratio. Regardless of which analysis you select, you'll be assured of uniform quality. Because the Timken Company rigidly controls quality from melt shop through final inspection.

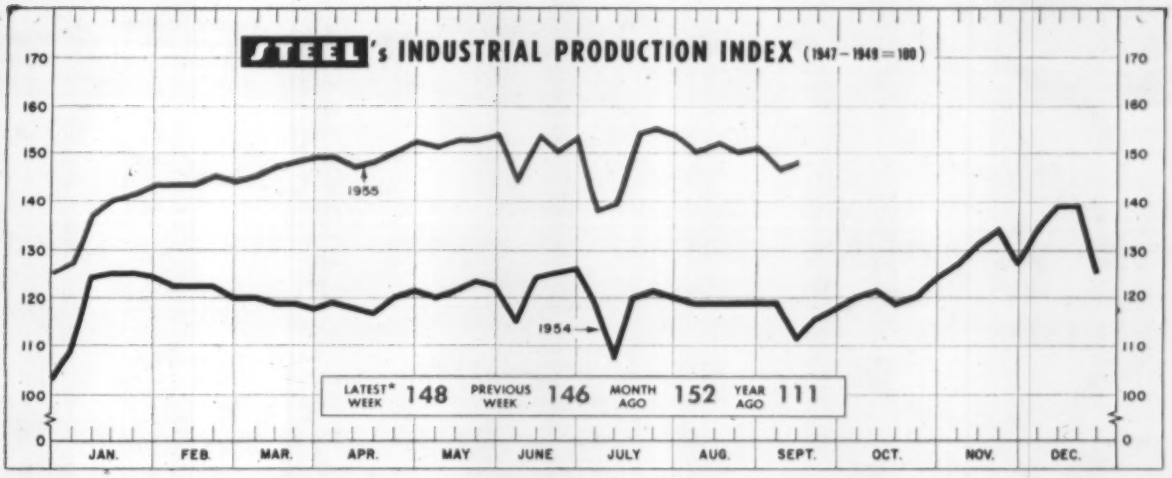
Let the Timken Company's metallurgists help solve your tube problems. *Ask the experts!* The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".



Electrolytic equipment used in Timken Company laboratories to extract non-metallic inclusions from steels in research on steel cleanliness

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Sept. 10. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%

Fall Pickup: New Peaks in Business

LOOK FOR the American economy to hit new peaks in the fourth quarter. Autos will sparkplug the upward charge, but steel, construction and other industries won't be far behind.

Here's how good times in the automobile industry spread out: General Motors Corp. alone has more than 21,000 prime suppliers. More than 1 million workers are employed directly in the manufacture of vehicles, parts and tires; another 2 million are in sales and service. Six million more are in related industries: Petroleum, road construction and maintenance, trucking and busses. There are the tens of thousands more who make the machines that make the cars, says the Automobile Manufacturers Association.

Good News—The industry plans to turn out a record 2 million cars in the fourth quarter.

Auto salesmen got a pleasant surprise in August, says *Ward's Automotive Reports*. New car deliveries climbed to 657,000 — "a startling occurrence considering the presence of cleanup campaigns."

Bright Spot—Sales in the month topped production by 43,200 units, meaning inventory reductions for many dealers. Strong sales of about 570,000 looked for in September (almost double planned production) keep hopes high that most producers will enjoy an orderly cleanup of 1955 models. Most makes have well into October to clear their salesrooms.

Steel is slowly climbing back to the 95 per cent-plus of capacity that it hit through most of second quarter. The brief strike, a hot summer and needed repairs cut into third quarter outturn, putting mills weeks behind on deliveries. The fourth quarter is traditionally a fine steelmaking period, and tradition figures to be served this year as usual.

Building Up—Construction will continue as a positive force. The level of contract awards, at record or near-record levels most of this

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,295[1]	2,264	1,583
Electric Power Distributed (million kw-hr)	10,850[1]	10,706	9,087
Bitum. Coal Output (1000 tons)	9,645	9,650	7,823
Petroleum Production (daily avg—1000 bbl)	6 645[1]	6,662	6,111
Construction Volume (*ENR*—millions)	$376	$330	$221
Automobile, Truck Output (*Ward's*—units)	99,653[1]	105,680	84,743
TRADE			
Freight Car Loadings (1000 cars)	790[1]	794	688
Business Failures (Dun & Bradstreet, no.)	210[1]	215	193
Currency in Circulation (millions)[3]	$30,436	$30,268	$30,115
Dept. Store Sales (changes from year ago)[3]	+11%	+9%	+12%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,064	$18,031	$14,181
Federal Gross Debt (billions)	$277.9	$278.2	$275.0
Bond Volume, NYSE (millions)	$21.1	$22.2	$10.0
Stocks Sales, NYSE (thousands of shares)	9,703	9,062	7,398
Loans and Investments (billions)[4]	$84,390	$84,098	$82,778
U. S. Govt. Obligations Held (billions)[4]	$30,952	$30,972	$35,862
PRICES			
STEEL's Finished Steel Price Index[5]	207.63	207.63	194.19
STEEL's Nonferrous Metal Price Index[6]	262.3	260.0	217.4
All Commodities[7]	110.6	110.5	109.9
Commodities Other than Farm & Foods[7]	117.2	117.1	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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REFRIGERATION

How can you go wrong by following the leading manufacturers of widely-diversified products?

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Many of them buy their quality-stampings from us . . . and have done so for years!

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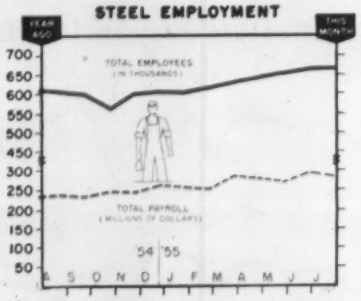
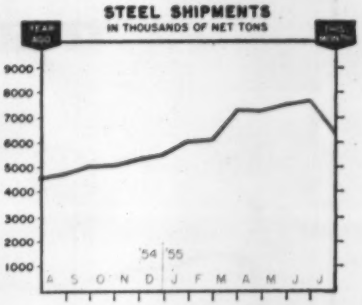
THE BUSINESS TREND





	Employment in Thousands		Payroll in Millions	
	1955	1954	1955	1954
Jan.	605	645	$258.8	$251.3
Feb.	616	636	255.1	236.6
Mar.	630	621	288.2	249.7
Apr.	643	609	282.0	232.6
May	654	606	249.1	234.4
June	667	609	298.4	236.4
July	676	608	296.8	232.8
Aug.	...	601	....	238.8
Sept.	...	597	....	234.6
Oct.	...	596	....	244.7
Nov.	...	599	....	247.7
Dec.	...	605	....	262.2

American Iron & Steel Institute
Charts copyrighted, 1955, STEEL

	Net Tons		
	1955	1954	1953
Jan.	6,009,958	5,727,600	7,067,636
Feb.	6,119,900	5,364,978	6,533,227
Mar.	7,268,795	5,583,690	7,436,919
Apr.	7,279,321	5,287,972	7,162,460
May	7,540,889	5,423,168	7,209,396
June	7,770,213	5,887,488	6,950,059
July	6,250,597	4,490,179	6,582,513
Aug.	.....	4,681,242	6,498,605
Sept.	.....	5,004,222	6,400,757
Oct.	.....	5,035,364	6,726,850
Nov.	.....	5,240,209	5,903,980
Dec.	.....	5,448,649	5,684,920

American Iron & Steel Institute

year, slipped back a little in August, but early September reports show the trend moving up again. More monthly records can be expected, topping off in industry's biggest year and the ninth one in a new high.

Consumers: Confidence Plus . . .

Much industrial activity is bolstered by the high level of consumer income and spending. There is a general feeling of well-being—that times will be good, jobs easy to get. Personal income in July was at an annual rate of $304.5 billion, up $3 billion from June.

It may climb even higher. Employment should reach a new peak this fall, even above the record 65.5 million jobholders reported for August by the Commerce and Labor departments.

In the August totals, most of the hiring came in manufacturing industries: The usual fall upturn started in soft goods manufacturing; radio and television plants pushed ahead to meet high consumer demand; employment in the machinery group held up better than usual over the summer in line with the upturn in plant and equipment spending.

Wages at Record High . . .

Helping out the total: Agricultural employment failed to drop as it usually does about that time of year. Encouraging: Record employment was reached in spite of auto employment being off 50,000 because of model change over.

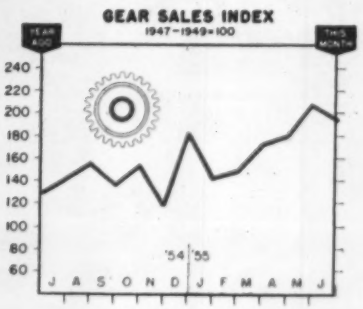
The work week lengthened to 40.8 hours, less than a half hour under the 1950 August postwar record, carrying average weekly earnings of production workers to $77.11, an all-time peak and 75 cents more than in July. Wage increases also figured in making the new record.

Over the year, average weekly earnings of factory production workers were up $6.05, with every industry reporting some gain. Largest increases are $14.17 in primary metals, $11.30 in rubber and $10.19 in transportation equipment.

PAs Say Business Is Good . . .

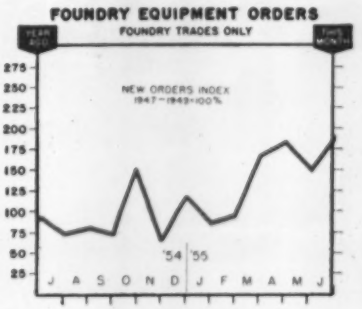
Both the sunshine and rain of current business weather are pointed to in the latest business survey of the Purchasing Agents Association of Chicago.

Such as: Inventories static, with no major trend up or down. Em-



	1955	1954	1953
Jan.	140.9	167.4	161.4
Feb.	148.5	165.1	188.1
Mar.	172.8	128.6	158.9
Apr.	179.8	158.2	217.1
May	205.2	132.5	189.8
June	193.5	127.4	146.5
July	....	141.3	120.7
Aug.	....	154.7	121.6
Sept.	....	135.1	135.6
Oct.	....	152.3	211.1
Nov.	....	116.7	144.9
Dec.	....	182.2	194.0

American Gear Mfrs. Assn.



	1955	1954	1953
Jan.	81.0	173.8	99.6
Feb.	90.4	99.9	97.5
Mar.	163.6	82.7	132.2
Apr.	178.6	125.3	111.8
May	145.7	80.8	182.1
June	186.8	86.4	156.4
July	....	68.8	158.9
Aug.	....	75.6	235.5
Sept.	....	68.3	127.7
Oct.	....	147.5	87.1
Nov.	....	61.4	149.4
Dec.	....	113.9	160.8

Foundry Equipment Mfrs. Assn.

ployment steady. End of the mass vacation period brings higher production. Backlogs holding up well, with 90 per cent showing same or larger.

Volume steady, with only 8 per cent reporting lower (about the same as for earlier months of this year). Profits are holding at the June level (83 per cent say same or better).

Not so good: Deliveries continue to extend, only 4 per cent see signs of improvement. As a result, buying policy is lengthening. Prices are up, say 87 per cent.

Metalworking Areas Report . . .

Business in the Pittsburgh area hits a new high for 1955, reports the Bureau of Business Research of the University of Pittsburgh. Gains in freight shipments and trade volume are responsible.

The brisk pace of Cleveland business (center of diverse metalworking activity) continues unchanged, according to the Federal Reserve Bank there.

The Security-First National Bank of Los Angeles reports the ninth consecutive month of business advancement. Factory employment hit a new all-time peak for the sixth straight month, though the rate of advancement is slowing. Aircraft employment in the area is about 190,000, highest since World War II.

Trends Fore and Aft . . .

E. O. Boshell, chairman and president, Westinghouse Air Brake Co., notes: "Definite improvement in the outlook for the company's divisions which sell to railroads . . . for divisions and subsidiaries serving the construction field the magnitude of the road building program contemplated should provide good business in the foreseeable future." . . . "Continued high level of commercial sales (automatic storage water heaters, steel shipping containers, furnaces and year-round air conditioners, appliances, automotive springs and bumpers) is expected for the balance of the year," says R. S. Rheem, president, Rheem Mfg. Co. . . . "The improvement in business which developed in the second quarter is accelerating, and earnings for the year as a whole should prove satisfactory," notes Robert S. Solinsky, president, National Can Corp. . . . Crown Cork & Seal Co.'s western division is having its best year, partly because of a new aluminum bottle cap.

COOLIDGE
Balls

CHROME ALLOY
AND
STAINLESS

COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Our youngster is ready for any job!
University of Hard Knocks
Know all ye men that
Ohio Forged Steel Rolls
have passed all tests for quality and performance and are doing an excellent job as work rolls in:
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GEORGE E. ELLIS
. . . Lipe-Rollway gen. sales mgr.

JOHN RUNDT
. . . chief eng. for Timken div.

W. J. McCUNE
. . . Sharon Steel gen. sales mgr.

George E. Ellis was named general sales manager, **Lipe-Rollway Corp.**, Syracuse, N. Y. He was manager of the modern tool works division of Consolidated Machine Tool Co.

Great Lakes Steel Corp., Detroit division of National Steel Corp., appointed **John V. Corr** an assistant vice president-sales; **William G. Gerstmeyer** assistant manager, bar sales; and **David McFarland,** resident manager of the Toledo, O., sales office succeeding Mr. Gerstmeyer.

Robert A. Niemi was made general manager of **Burroughs Corp.'s** new manufacturing plant at Plymouth, Mich., which will manufacture Sensimatic accounting machines and associated products.

Robert L. Wolff was elected vice president - engineering, Centralab division, **Globe-Union Inc.**, Milwaukee.

Harold G. Warner was appointed works manager, **Cadillac Motor Car Division,** General Motors Corp., Detroit. He succeeds **Harold A. Barber,** retired.

Herbert J. Watt was elected president of **Canton Co. of Baltimore** and its subsidiary, Canton Railroad, Baltimore. He recently retired as assistant vice president of western sales for United States Steel Corp. at Chicago.

John Rundt was made chief engineer, division of research and development, **Timken Roller Bearing Co.**, Canton, O. **Alva Kopatz** was appointed chief draftsman for the division.

Russell T. Lund, operating manager, was elected a vice president of **National Carbide Co.**, division of Air Reduction Co. Inc., New York. He recently has devoted most of his time to the calcium carbide and acetylene generating plant at Calvert City, Ky., where he continues headquarters.

Presstite Engineering Co., St. Louis, named **George Kuhn** sales manager of its building products division. Mr. Kuhn was sales manager for Brainard Steel Division, Sharon Steel Corp.

Dr. Robert M. Brick was named director of the department of metallurgy of **Continental Can Co.'s** central research and engineering division. He was director of the school of metallurgical engineering at the University of Pennsylvania.

Elvin E. Hallander was elected president and a director of **Lynch Corp.**, Toledo, O. He was with Trane Co.

Ben C. Kays was made purchasing agent for **Northwestern Steel & Wire Co.**, Sterling, Ill.

W. J. McCune was appointed general manager of sales, **Sharon Steel Corp.**, Sharon, Pa. **R. C. Garlick,** assistant vice president and general manager of sales, now devotes full time to his duties as assistant vice president.

Dennis T. Fitzmaurice fills the new post of industrial sales manager at **Cherry-Burrell Corp.**, Chicago. **Ralph N. Baker,** sales manager at Cedar Rapids, Iowa, is now sales manager of the Chicago branch.

Henry V. Bootes, vice president, **ACF Industries Inc.**, New York, was made a member of the operating committee and also head of the marketing department for ACF's seven divisions.

Guenther H. Hille was made sales engineer for **Mallory-Sharon Titanium Corp.**, Niles, O. He will work with aircraft engine manufacturers and forging companies. He was director of purchases at Salem-Brosius Inc.

Christiaan Van Raaphorst was made plant superintendent at **Waterbury Mfg. Co.**, Waterbury, Conn., division of Chase Brass & Copper Co. He was superintendent of the screw machine division.

Bill McAvay heads up the new eastern sales and service division of **Burg Tool Mfg. Co.** He is at 15 W. 44th St., New York. He

most recently was eastern division sales manager for DoAll Co.

J. M. Hollingsworth was made Dallas sales manager for **Lone Star Steel Co.**

Ludwik Zdanowicz, who formerly installed Sendzimir cold rolling mills for Armzen Co. as service engineer, will operate **Calstrip Steel Corp.'s** Sendzimir mill at Los Angeles. He was appointed chief engineer.

William W. Kingman was appointed to an executive post at **Wayne Mfg. Co.,** Pomona, Calif. His duties concern administration of the new industrial sweeper program.

Robert P. Bremner was made manager of mining operations for **Youngstown Sheet & Tube Co.,** Youngstown.

L. A. Fugassi was appointed assistant chief engineer in the engineering department of **Weirton Steel Co.,** Weirton, W. Va., division of National Steel Co.

Combustion Engineering Co., New York, appointed **Carmine J. Grossi** manager of its export division; **Frank J. Bader,** assistant general sales manager at New York; and **Herman C. Reichard,** district manager at San Francisco.

James P. Butler, assistant sales manager, fills the new post of assistant to the president of **Beryllium Corp.,** Reading, Pa.

Walter D. Sellers was named assistant sales manager, **Leach Relay Division,** Leach Corp., Los Angeles.

Paul F. Pardonner was made Detroit district sales manager, **Armco Steel Corp.** He succeeds **R. L. Shugg** who continues with the company as a consultant.

Lou H. Lundstedt, head of Lou H. Lundstedt Co., Chicago, was made sales representative for **Youngstown Steel Tank Co.,** Youngstown.

Warren L. Hardy succeeds **Myron N. Smith,** retired, as business research manager, **Norton Co.,** Worcester, Mass.

Arvel A. Mann was made factory manager at the Peoria, Ill., plant of **Hyster Co.**

DR. DAVID B. PARKINSON

JOHN H. HARRIS

. . . elected vice presidents of Brush Electronics

Dr. David B. Parkinson and **John H. Harris** were elected vice presidents of **Brush Electronics Co.,** Cleveland, a unit of Clevite Corp. Dr. Parkinson, as vice president-general engineering manager, is responsible for design and production engineering. Mr. Harris, as vice president-general works manager, is responsible for manufacturing, production control, maintenance and materials procurement.

S. C. Bielawski was made assistant to the purchasing agent at the West Allis, Wis., Works of **Allis-Chalmers Mfg. Co.** He is succeeded as tractor purchasing agent by **E. M. Faber.**

Lithium Corp. of America, Minneapolis, appointed **J. Dean Herman** chief chemical engineer; **Gerald A. Munson,** chief mineral engineer; and **John Talley Sr.,** branch manager of the Black Hills, S. Dak., operations.

Leeds & Northrup Co. appointed **William L. Kimber** district sales manager at Buffalo to replace **Joseph M. Jackson,** now manager of the Philadelphia district sales office. **W. Spencer Bloor** was made sales manager, Atlanta district, to replace **William A. Macan III,** manager of the Cleveland district sales office.

W. D. Kleppinger was elected vice president of the chemical equipment division of **General Ceramics Corp.,** Keasbey, N. J. He was general manager.

John L. Hallman was made manager, marketing division, **Alan Wood Steel Co.,** Conshohocken, Pa. He was Philadelphia district sales manager.

Dr. Jacob O. Kamm was elected president, **Cleveland Quarries Co.,** Amherst, O., and of its subsidiary, **Silica Chemicals Inc.**

John Cameron was named assistant chief engineer, Hamilton mechanical presses, Hamilton division, **Baldwin - Lima - Hamilton Corp.,** Hamilton, O. He formerly was with Clearing Machine Co.

Andrew Deane, formerly assistant to the vice president of U. S. Steel Corp.'s industrial engineering division, was elected vice president-materials of **United States Steel Homes Inc.,** subsidiary, New Albany, Ind.

Richard M. Gerber was made manager, building products department, **Kaiser Aluminum & Chemical Sales Inc.,** Chicago.

A. N. Wohlwend was made director of market research and development, **Stauffer Chemical Co.,** New York. He succeeds **P. S. Brallier,** now technical adviser to the president.

B. E. Phillips was named assistant sales manager, industrial truck di-

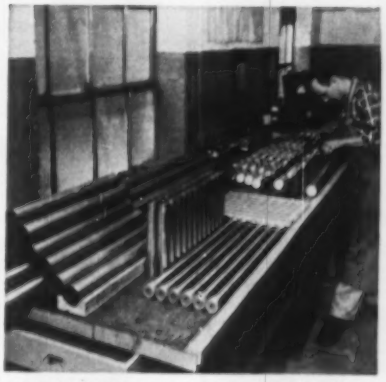
SUPERIOR TUBING acts as a temperature and mechanical handling shield for delicate sub-surface, radioactive logging instruments.

SMOOTH SURFACES, CLOSE TOLERANCES, LIGHT WEIGHT: REASONS WHY SUPERIOR TUBING IS USED TO HOUSE THESE DELICATE WELL SURVEYING INSTRUMENTS

Well Surveys of Tulsa, Okla., purchases Superior Seamless Type 304 Stainless Tubing in large OD, light wall sizes and in 63 in. lengths. Into these tubes, which in the finished state vary from 28 to 31 in., radioactive well-logging instruments are inserted—instruments so delicate that stray electrical waves or gases leaking into the casing may throw them off.

For that reason, the tubing is supplied in the "as drawn" condition, with a smooth surface that has a high radiation factor. Stainless is specified because plated material used in the past flaked off and short-circuited the instruments. The thin wall size (2.098" x .018" wall) is important; first, because of weight and, second, because of the close fit demanded. After the instruments are inserted, the tubing—closed by spinning—goes into an outer housing which must withstand pressures of 20,000 psi.

Whatever you want tubing for—an instrument housing, hypodermic needle, radio antenna, or heat exchanger—you'll find that the high quality of Superior tubing saves you time, money and production headaches. Send for your free copy of Bulletin 40—*A Guide to the Selection and Application of Superior Tubing*. SUPERIOR TUBE COMPANY, 2005 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.



PRE-TESTING an assembly before it is inserted into the Superior tube.

Superior Tube

The big name in small tubing

All analyses .010 to ⅝" OD
Certain analyses in light walls up to 2½" OD

JOHN T. HICKEY
. . . Phoenix gen. mgr., Motorola Inc.

WILLAM L. BATTEN
. . . new post at Vanadium-Alloys Steel

JOHN P. BANKSON
. . . Shenango-Penn Mold sales mgr.

vision, **Clark Equipment Co.**, Battle Creek, Mich.

At **Motorola Inc.'s** transistor manufacturing facility in Phoenix, Ariz., **John T. Hickey** was made general manager; **Dr. Virgil E. Bottom**, director of research and development; and **Edmund G. Shower**, product production manager.

K. O. William Sandberg was made manager of the custom-molding plant of **General Electric Co.'s** plastics department, Decatur, Ill.

New sales engineering and service branch offices of **Cleveland Pneumatic Tool Co.** are under the direction of **Kenneth J. Warren**, Dexter Horton Bldg., Seattle; and **Edwin J. Bausch**, 420 S. Beverly Dr., Beverly Hills, Calif.

William J. Burns was appointed chairman of the advisory committee and comptroller of **Amherst Mfg. Corp.**, Buffalo. He was executive vice president of Kulp-Waco.

William L. Batten was made manager of **Vanadium-Alloys Steel Co.'s** powder metallurgy department at Latrobe, Pa. He has been connected with the department as a sales and service engineer since its beginning in 1949.

Robert B. Butler was made sales manager, **AiResearch Industrial Division**, Garrett Corp., Los Angeles.

John P. Brecher, former general manager of **Nu-Bone Co.**, was named plant engineer at **Garfield Mfg. Co.**, Garfield, N. J. **John Kusha**, formerly with Tech Art Plastics, was made superintendent of the hot molding division. **Edmund A. Callahan**, formerly with Wright Aeronautics and Air Associates, was made supervisor of standards.

Donald R. Meckstroth joined **Westinghouse Electric Corp.** as manager of marketing services for its air conditioning division at Staunton, Va. He was with Servel Inc.

John P. Bankson joins **Shenango-Penn Mold Co.** as manager of sales. He has headquarters at the firm's offices in Sharpsville, Pa. He has served in the sales division of Harbison-Walker Refractories Co. for 25 years, most recently as assistant to the vice president. Mr. Bankson succeeds **W. Crawford Sherlock** who was made assistant to the vice president and manager of production planning.

Carl Claus was named director of staff at **Babcock & Wilcox Co.**, New York. He was executive assistant in charge of manufacturing and sales for the refractories division.

Donald B. Shank succeeds **Edgar W. Conliff**, retired, as superintendent at **Duluth, Missabe & Iron Range Railway Co.**, Duluth.

Robert E. Wagenhals was made manager of a sales forecast department, newly established at **Timken Roller Bearing Co.**, Canton, O.

OBITUARIES...

James McKenna, vice president and general manager, **H. L. Judd Co.**, Wallingford, Conn., division of Stanley Works, died Sept. 4.

Wilbur C. Knapp, 47, general manager, **Archer Mfg. Co.**, Rochester, N. Y., died Sept. 1.

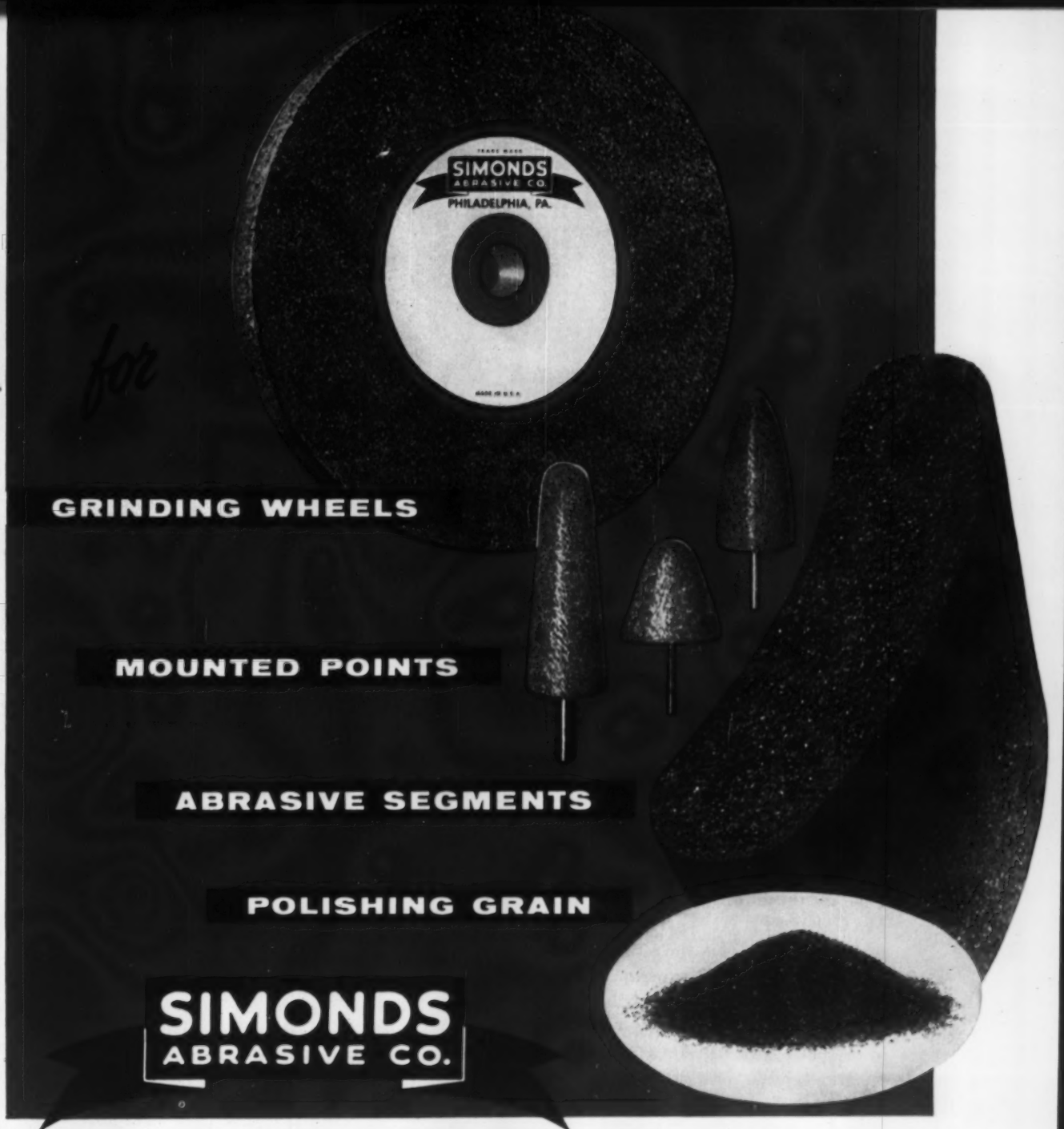
Howard T. DeRemer, works manager, **Selas Corp. of America**, Philadelphia, died Aug. 28.

Ben L. Cook, 47, district manager of **Timken Roller Bearing Co.'s** Pittsburgh office, industrial division, died Sept. 6.

Carl F. Jauch, 67, president and treasurer, **Dayton Fabricated Steel Co.**, Dayton, O., died Aug. 30.

Stanley W. Brandel, 66, chairman of **Marlin-Rockwell Corp.**, Jamestown, N. Y., died Aug. 30.

William J. Strangward, 76, president, **Forest City Foundries Co.**, Cleveland, died Sept. 5.



at your service with extra service

What's *your* idea of service? Here's ours! A distributor network geared to help you over production crises as well as in your everyday grinding problems. Free consultation with our field engineers to search out new economies for you. Close teletype communication between our main plant and branches to expedite your orders. New mass production equipment to give you 3 to 4 weeks delivery on small diameter wheels . . . plus the extra product service inherent in Simonds manufacture. If this concept of service coincides with yours, get it by specifying Simonds Abrasive products.

EXTRA SAVINGS FROM YOUR SIMONDS DISTRIBUTOR
STOCK · SERVICE
KNOW-HOW

SIMONDS ABRASIVE COMPANY · PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco • Distributors in Principal Cities
Division of Simonds Saw and Steel Co., Fitchburg, Mass. • Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Quebec, Lion Grinding Wheels Div., Brockville, Ont. and Simonds Canada Abrasive Co., Ltd., Arvida, Quebec

Baker's Magdolite

looks back with pride . . . and forward with confidence

Reviewing the past, The J. E. Baker Company is proud of the part it has played in the astounding growth of the steel industry. Since 1889 the JEBCO name has stood for superior products. One of these products, BAKER'S MAGDOLITE the *original* dead-burned dolomite, was the result of continuous research and experimentation to find a far better basic lining for open hearth and electric furnaces. Today as in the past, BAKER'S MAGDOLITE offers increased furnace efficiency at lower refractory costs.

In the future, users of BAKER'S MAGDOLITE can be assured of constantly improved quality and effectiveness, in keeping with the tremendous strides foreseen in increased steel production.

If you haven't done so in the past, be sure to try BAKER'S MAGDOLITE in the near future. You'll discover as others have through the years that the properly burned, grain-sized particles of BAKER'S MAGDOLITE mean more uniform ingots, in greater numbers and with less defective material. Next time specify BAKER'S MAGDOLITE.

JEBCO
PRODUCTS
SINCE 1889

*Janus, the two-faced mythological Roman God of Doors and Gates, could see both what passed behind and before him at the same time.

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

More Titanium

Rem-Cru to install processing equipment in new Midland, Pa., property as demand gains

REM-CRU TITANIUM INC., Midland, Pa., is enlarging its facilities. This marks another step forward in the company's expansion program for tonnage production of titanium mill products.

Rem-Cru, jointly owned by Remington Arms Co. and Crucible Steel Co. of America, purchased a group of five buildings and ten acres of land from Crucible Steel in Midland, Pa. Equipment, specifically engineered for processing titanium, will be installed as rapidly as required to meet increasing demand.

The buildings, containing more than 237,000 sq ft of floor space, are equipped with modern materials handling facilities, pickling lines and other metal processing equipment which will be converted for the needs of titanium production.

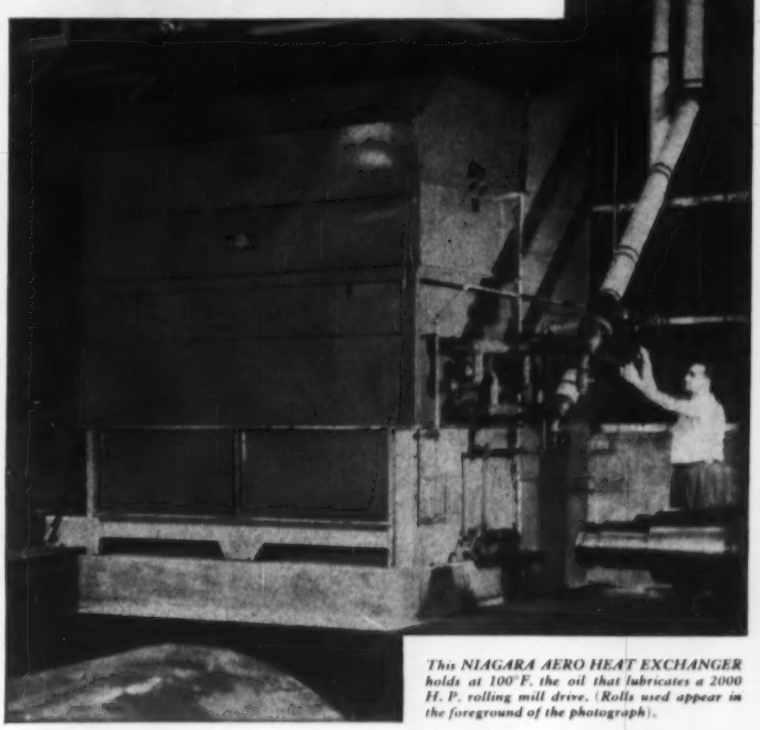
Integration—C. I. Bradford, president and general manager of Rem-Cru, in making the announcement said: "The purchase of this property will allow us to move toward our goal of constructing completely integrated facilities for producing titanium mill products. It is a firm expression of our confidence, not only in titanium's increasingly vital role in providing a practical material of construction for supersonic aircraft and light weight ordnance equipment, but in titanium's place in the future of American industry in the chemical, petroleum, marine, electronic and transportation fields."

Rem-Cru and the titanium sponge producers are expanding their facilities in anticipation of large future requirements. During periods of sudden increases in demand by the aircraft industry, the nondefense customer who has converted to titanium will have his supply protected by order M-107 of the Business & Defense Services Administration of the Department of Commerce. This order permits the titanium producer to reserve up to 10 per cent of his

(*Please turn to page* 92)

You save money and trouble when you keep

ACCURATE CONTROL OF LIQUID TEMPERATURES



This NIAGARA AERO HEAT EXCHANGER holds at 100°F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

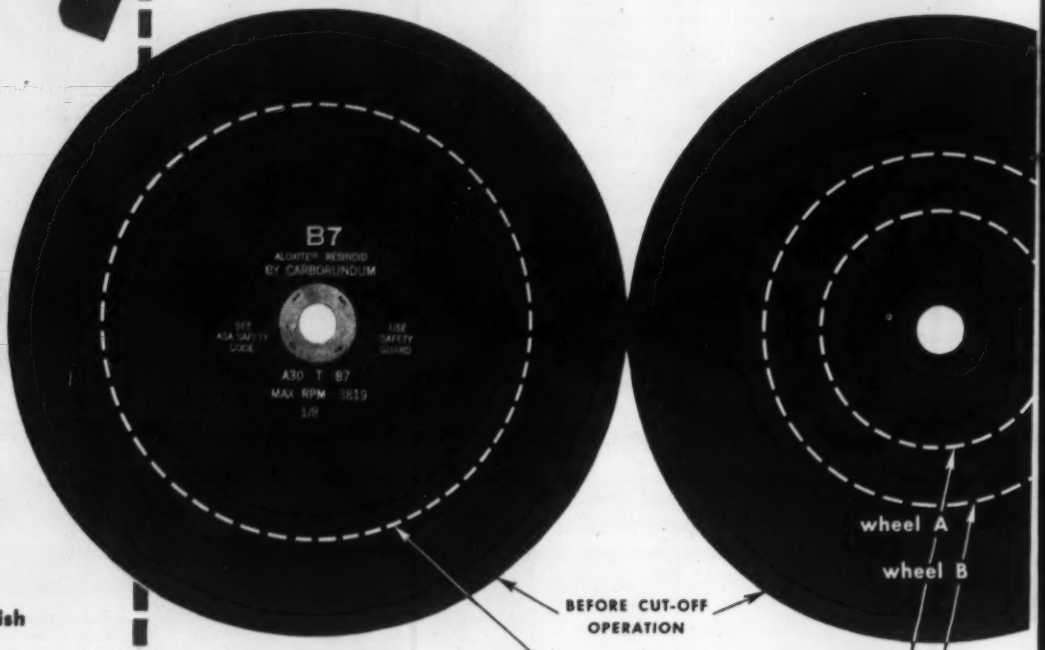
Dept. S, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

B7 NEW BOND TYPE

★ **LONGER WHEEL LIFE**

with equal quality of finish

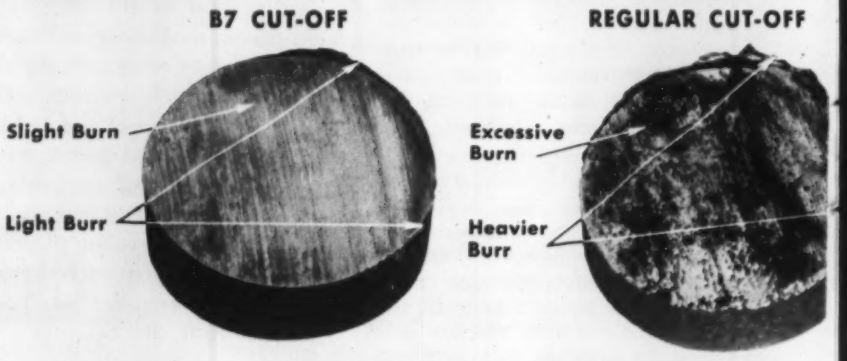


B7 BOND WHEEL

After same number of cuts, B7 outlasts Wheels "A" and "B" by 10 - 25%.

★ **BETTER QUALITY OF FINISH**

with equal wheel life



COLD ROLLED BAR STOCK, 1⅛" DIAMETER

...continually puts more SENSE in your abrasive DOLLAR

SETS NEW STANDARDS OF PERFORMANCE

FOR ABRASIVE CUT-OFF

WHAT ARE YOU LOOKING FOR in your cutting-off operations... freedom from burn and burr?... close tolerance accuracy?... high production?

Here's a revolutionary new bond type—B7—which is the finest combination yet developed to give you maximum work finish, maximum cut-off speed, and maximum wheel life.

Thousands of these new wheels have been job-proven on work just like yours. The B7 Bond Cut-Off Wheel is *another* CARBORUNDUM development. It's a wheel you'll use with profit!

PLUS NEW FEATURES

NEW distinctive wheel marking —for instant recognition

NEW simplified gradings —R, T, V grades only

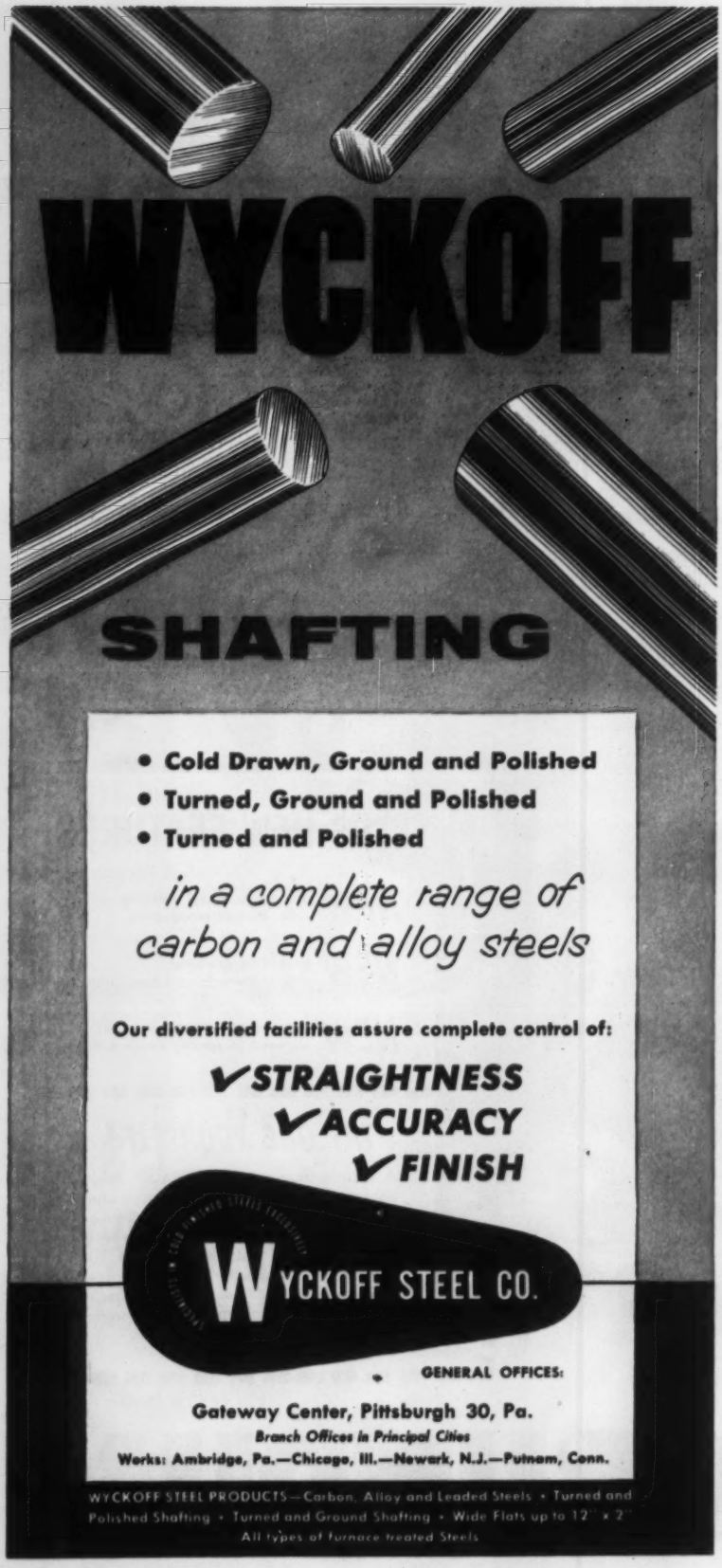
NEW rough sides are standard— no need to specify RS on order

TRY ONE YOURSELF!

A simple demonstration in your shop, on any material you're cutting, will convince you that B7 Bond Resinoid Cut-Off Wheels will outperform any other wheels you can use. Call your Carborundum Distributor or salesman to arrange a time most convenient to you. He's listed in the yellow pages of your phone book under "Abrasives" or "Grinding Wheels."

CARBORUNDUM

REGISTERED TRADE MARK


WYCKOFF
SHAFTING
• Cold Drawn, Ground and Polished
• Turned, Ground and Polished
• Turned and Polished
in a complete range of carbon and alloy steels
Our diversified facilities assure complete control of:
✓STRAIGHTNESS
✓ACCURACY
✓FINISH
WYCKOFF STEEL CO.
GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa.—Chicago, Ill.—Newark, N.J.—Putnam, Conn.
WYCKOFF STEEL PRODUCTS—Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Wide Flats up to 12" x 2"
All types of furnace treated Steels

(*Concluded from page* 89)

mill product capacity for nondefense applications.

Giddings & Lewis Diversifies

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., purchased Cincinnati Bickford Tool Co., Oakley, O. (Cincinnati), and Kaukauna Machine Corp., Kaukauna, Wis. Both companies will continue operations at their present locations as divisions of the parent company. Cincinnati Bickford is a leading producer of radial and upright drills and other machine tools. Kaukauna's leading line is one of portable universal drilling and tapping machines. Its manufacturing is carried on in a plant and foundry which have 96,000 sq ft of floor space.

To Make Drop-Forged Hardware

Brewer-Titchener Corp., Cortland, N. Y., established a division to manufacture drop-forged marine and industrial hardware. The Marine & Industrial Hardware Division will be under the guidance of W. S. Story, formerly vice president and general manager of Maine Steel Inc., Portland, Me.

Plating Firm To Build Plant

Van der Horst Corp., Olean, N. Y., will establish plant facilities at 2610 S. Shields Ave., Chicago. The property has 37,000 sq ft of manufacturing space and will be equipped for a 48,000 amp-hr plating capacity. The firm does heavy industrial electroplating.

Chicago Firms Merge

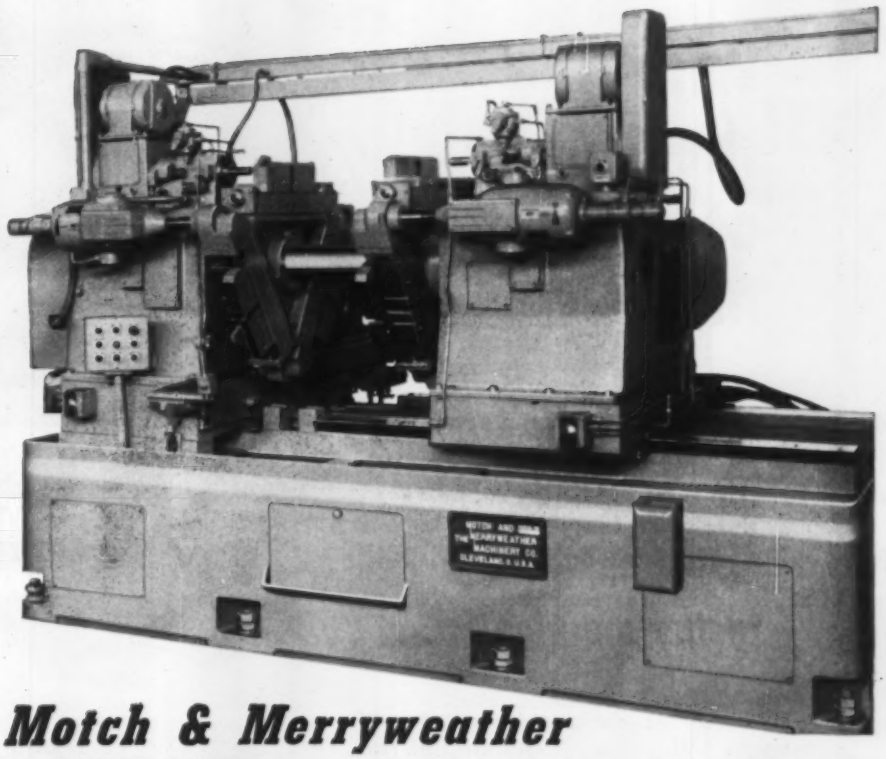
Armorite Corp. and Jet Combustion Inc., both of Chicago, have merged. Plans are being made to extend the firm's activities to standard designed products, particularly in the field of automation. Jet Combustion is an engineering firm specializing in the design and construction of large forge, heating and other types of furnaces and allied equipment. Officers of the new corporation are: H. W. Norman, chairman; V. P. Tegarden, president; L. W. Horvath, general manager and executive vice president; J. D. Joyce,

Heavy Duty

Rigid

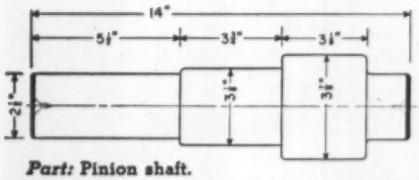
Accurate

Productive



The Motch & Merryweather
No. 3-MCT Milling and Centering Machine
FOR UNIVERSAL PRODUCTION

Adopt this Active Asset to Automation



Part: **Pinion shaft.**
Operation: **Mill and center drill both ends.**
Production: **220 pieces per hour.**

Mass production, yet with extreme accuracy, — that is the central requirement for preparing parts which go to your automatic equipment. Begin automation *right* by preparing your parts *right* on the Motch & Merryweather 3-MCT Milling and Centering Machine. This universal heavy duty unit excels for high single-purpose production, while quick set-up makes short runs profitable. Automatic loading and unloading may be incorporated to handle extremely high production. The 3-MCT performs with a dispatch and precision hitherto unknown.

THE MOTCH & MERRYWEATHER MACHINERY CO.

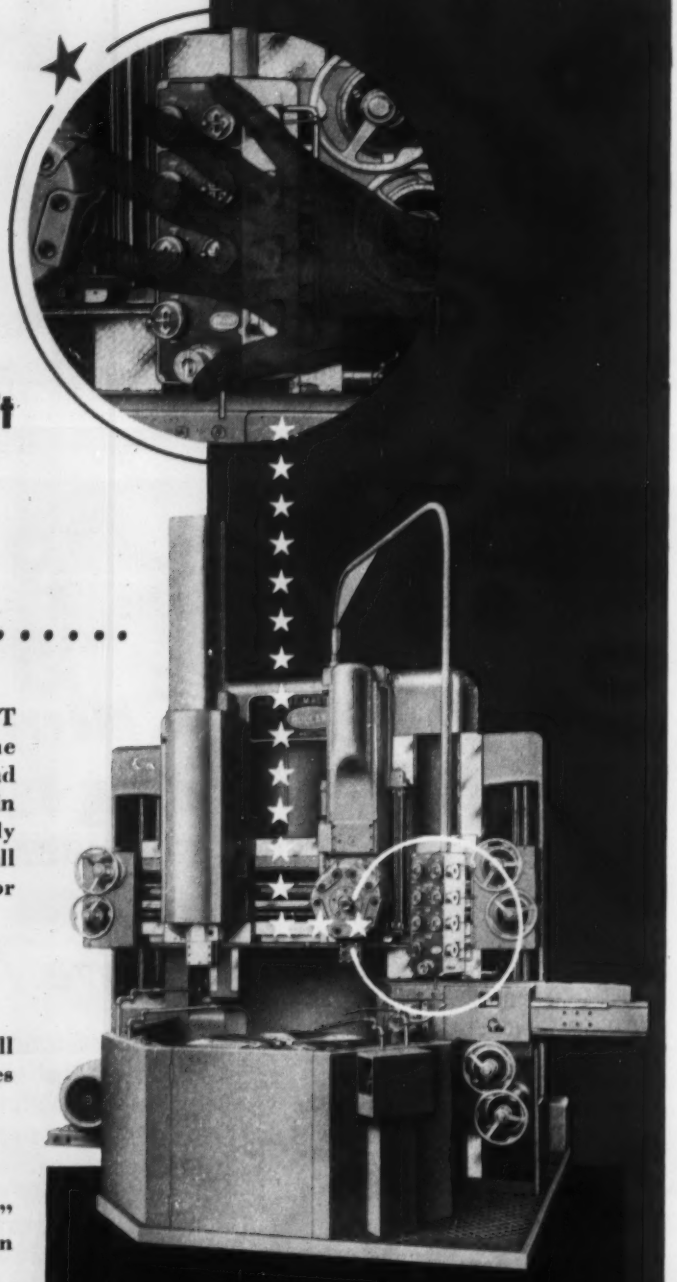
MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

[illegible] Vertical Turning, Automatic and Special Machines

Within the Span of a Man's Hand

The power to transmit the commands of the operator *to the machine . . . . . .*



By means of the movable PENDANT CONTROL the start and stop of the spindle; selection of speeds, feeds and directional movements of all heads in feed or traverse are quickly and easily accomplished. Interlocks and a stopall stick provide safety for both operator and machine.

Additional features include:

SCREW FEED

for vertical and horizontal motion of all heads — to assure fine smooth finishes with greater accuracy.

POWER INDEXED MAIN TURRET (optional)

Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

SEVENTY FIFTH BULLARD ANNIVERSARY

CUTMASTER
VERTICAL TURRET LATHE
Model 75

THE BULLARD COMPANY
BRIDGEPORT 2, CONN.

AVAILABLE IN 26, 36, 46, 56, 66 AND 76 INCH SIZES

vice president in charge of engineering; E. M. Crous, secretary.

Iron Fireman Plans New Plant

Iron Fireman Mfg. Co., Cleveland, will construct a $900,000 manufacturing plant at Ligonier, Ind. The company makes heating and power equipment, electronic and electrical products and aircraft parts.

American Crucible Buys Kenco

American Crucible Products Co., maker of bronze bearings and wearing parts, purchased Kenco Inc., both of Lorain, O. Kenco makes submersible pumps for sump, industrial marine and contractor use.

Trinity Steel To Build

Trinity Steel Co. Inc. will build a 60,000-sq-ft home office and plant on Irving boulevard, Dallas. The firm produces domestic gas systems, bulk storage tanks, delivery trucks and heavy-transport gas tanks.

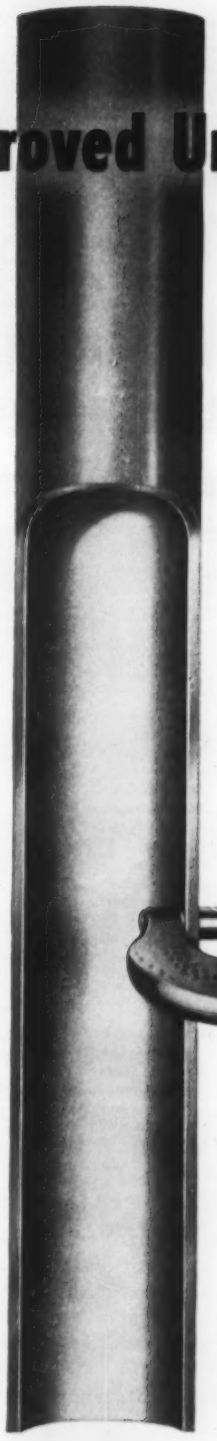
Installs Big Roll Forming Unit

One of the largest cold forming mills built in this country in recent years has been delivered to Inland Steel Products Co., Milwaukee. It was made by American Roller Die Corp., Wickliffe, O., producer of roll forming machines, pipe and tube mills, forming rolls, tubing and pipe rolls and cutoff machines. The giant machine is designed to form steel roof decks and flooring for large buildings. The production line is 180 ft long, and the equipment weighs about 300 tons. The main mill is about 30 ft wide and 10 ft high. It rolls up to 132 fpm and is fed by 12,000-lb steel coils.

REPRESENTATIVES

Wiedemann Machine Co., Philadelphia, manufacturer of turret punch presses and special machine tools, appointed Rees Machinery Co. Inc., Pittsburgh, as its sales representative in West Virginia,

(*Please turn to page* 98)



Proved Under PUNISHMENT

STANDARD CYLINDER TUBING

"Mirror Finished" to precision tolerances, it's used in automobile shock absorbers, power steering, hydraulic pumps . . . without further sizing or finishing.

Here's a busy part of an automobile shock absorber that's built for brutal punishment. It's Standard's modern "mirror-finish" Cylinder Tube. So that it won't weaken or leak under punishment, every inch of this tubular "toughie" must measure up to exacting specifications—in cylinder finish . . . in I.D. tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, to shocks up to 9000 P.S.I. The elimination of broaching or further processing of any kind effect significant savings for our customers in product assembly.

As you see here, the engineering involved behind the application of tubing to your product is *more than skin deep at Standard.* Our engineers will gladly show you why in helping you with your tubular application—whether it involves a simple structural or mechanical member . . . or a precision application.

Send for 8-page folder on all Standard products or see Sweet's Design Catalog.

MAKE "STANDARD" YOUR SOURCE FOR—

- WELDED MECHANICAL TUBING
- WELDED STAINLESS TUBING
- BOILER AND HEAT EXCHANGER TUBING
- EXCLUSIVE "RIGIDIZED" PATTERNS

STEEL TUBING SIZES: ½" O.D. TO 5½" O.D.—.028 TO .260 WALL.
STAINLESS SIZES: ¼" O.D. TO 4½" O.D.—.020 TO .154 WALL.

Announced in April, Alcoa's Labeling Program Is Already in High Gear

HUNDREDS OF MANUFACTURERS HAVE SIGNED THE ALCOA LABELING AGREEMENT TO GIVE THEIR PRODUCTS THIS NATIONAL MARKETING AID

As this advertisement goes to press, manufacturers in the following product classifications have signed the Alcoa Labeling Agreement!

Air Diffusers
Architectural Parts
Auto Safety Belts
Awnings
Baby Articles
  Baths
  Bathtub Anchors
  Beds
Bearings
Bird Baths
Boat Masts
Boats
Boat Tops
Builders' Hardware
Canoes
Capacitors
Carpenter Squares
Carrying Cases
Carts
Clamps
Coat Hangers
Cooking Utensils
Cord Winders
Core Boxes
Display Racks
Diving Boards
Dock Plates
Door Closers
Doors & Frames
Easels
Electric Equipment
Electric Meter Cases
Electric Tools
Engine Bearings
Fans
Farm Gates
Fencing
Fishing Equipment
Floor Brushes
Flower Holders
Food Cabinets & Racks
Furnace Pipe & Fittings
Furniture
Golf Carts
Greenhouses
House Trailers
Ice Chests
Ice-Cream Dippers
Insect Screening
Insulation
Jalousies
Ladders
Lawn Mowers
Leg Bands (poultry)
Leveling Tools
Lighting Standards
Lightning-Rod Cable
Litho Sheet
Luggage
Luggage Racks
Medicine Cabinets
Metal Paste
Movie Screens
Newspaper Racks
Packaging
Paints
Panels
Pasteurizers
Pike Poles
Pitchers
Portable Ice Chests
Poster Trim
Propellers
Refrigerators
Roof Coatings
Sander-Polishers
Sash
Scaffolds
Screening
Shipping Containers
Shower Doors
Siding
Signs
Siphon Tubes
Sliding Doors
Sprayers
Stadia Rods
Steak Platters
Steam Irons
Storm Windows & Doors
Strollers
Surgical Supplies
Tent Poles
Textile Equipment
Thresholds
Tile
Trailers
Truck Bodies
Tumbler Sets
TV Antennas
Valves
Vapor Barrier
Vulcanizing
  Clamps Trim
Wall Panels
Water Heaters
Weatherstrip
Windows
Zippers

Signing the Alcoa Labeling Agreement enables these Alcoa customers to use the powerful Alcoa name in conjunction with their own. The Alcoa label on their product or package tells distributors, dealers and customers that here is aluminum value—that they are users of aluminum backed by 67 years of knowhow. Thus, they share in the 400,000,000 impressions of the Alcoa label that will appear in national magazines and on television in 1955.

The accumulated recognition of the Alcoa name, which for 67 years has stood for the finest in aluminum, is available to Alcoa customers with their use of the Alcoa label. Complete plans and detailed advantages of its use are available from your local Alcoa sales engineer. The Alcoa office nearest you is listed under "Aluminum" in your classified phone book. ALUMINUM COMPANY OF AMERICA, 876-J Alcoa Building, Pittsburgh 19, Pa.

Alcoa's Development Division—to aid you in profitable use of aluminum.

Alcoa's Labeling Program—to help you market the fine products that result.

BIGGEST ALUMINUM NEWS OF THE YEAR . . . New Alcoa Label, Your Guide to Aluminum Value in Scores of Products!

You know by now that Alcoa® Aluminum—the modern metal—is widely used by leading manufacturers to make scores of light, lasting products for better living—from cars to candlesticks.

You know, too, something of the extra qualities offered you by manufacturers who use carefree, corrosion-resistant aluminum. Maybe you've wondered, "How can I be sure I'm getting aluminum value in a product I buy for my home or personal use?"

Soon, millions of these colorful labels will give you the answer.

Manufacturers who use our metal will be using these labels on screen and storm windows, furniture, housewares, cookware . . . guiding you to aluminum value. On whatever product you see it, the Alcoa label tells you, "Here is metal with a pedigree, born in Alcoa Research, chosen by a manufacturer who wants to give you your money's worth in aluminum value."

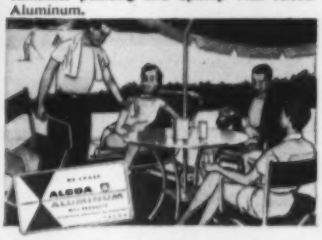
ALUMINUM COMPANY OF AMERICA, 876-J Alcoa Building, Pittsburgh 19, Pennsylvania.

Your Guide to Aluminum Value

© 1955, Aluminum Company of America

SOON—Manufacturers of These Products Will Be Using the Alcoa Label as Your Guide to Aluminum Value

MANUFACTURERS of residential building products like awnings, combination screen and storm doors and windows, gutters and downspouts eliminate painting and upkeep with Alcoa Aluminum.



OUTDOOR furniture of Alcoa Aluminum is unaffected by weather, requires no painting, is easy to move and practical for indoor use when winter comes.

HOUSEWARES departments of your favorite stores are showing cookware, wastebaskets, step-stools, tumbler sets, and dozens of other attractive, lasting aids to carefree aluminum living.

FOR SUMMER FUN, choose a light, strong boat, outboard motor, and camping, picnicking and barbecue equipment of Alcoa Aluminum.

INDUSTRIAL PRODUCTS like truck and trailer bodies, truck wheels, electrical and building products use Alcoa Aluminum for high performance at low cost.

QUALITY CONTROL FOR MASS PRODUCTION. Days have been chopped to minutes by the installation of such equipment as this direct-reading spectrometer which can analyze beryllium copper alloys while they are still molten.

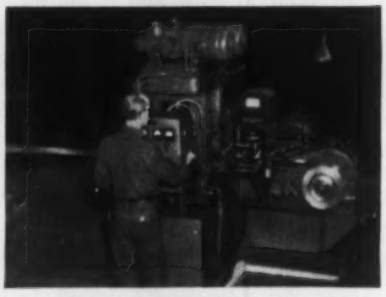
NEW MANUFACTURING FACILITIES INCREASE PRODUCTION, IMPROVE QUALITY OF "BERYLCO" BERYLLIUM COPPER

The production of beryllium copper, that uniquely versatile alloy which does so many jobs so well, has always been a complicated process. Beryl ore must be processed chemically to produce beryllium oxide. Master alloy is obtained by subjecting beryllium oxide, copper powder, and carbon to high temperatures in electric arc furnaces. Subsequent operations include ingot casting, soaking, annealing, pickling, hot and cold rolling, and drawing.

New technological advances—represented by a multimillion-dollar new investment in plant and equipment by The Beryllium Corporation—have successfully adapted basic quality control to large-scale production. Users of "Berylco" will reap the benefits. The spectrometer shown above, for instance, enables very close chemical control to be exercised in the production of the various beryllium copper alloys. New rolling mills produce strip to closer tolerances while enhancing over-all quality. These and other new tools produce sizes and forms not previously available—and in many cases have achieved economies which have already been passed on to users.

Write for engineering help or sample testing material.

ORE GRINDING MILL—a part of the fully integrated "Berylco" facilities.



NEW COLD-ROLLING STRIP MILL finishes beryllium copper to close tolerances.

BERYLCO®

THE BERYLLIUM CORPORATION

DEPT. 5-J, READING 19, PA.

STOCKED BY WAREHOUSE DISTRIBUTORS THE COUNTRY OVER

(*Concluded from page* 95)

western Pennsylvania and southeastern Ohio.

Jones & Lamson Machine Co., Springfield, Vt., appointed Clark & Osborne Co., Indianapolis, to handle sales of its optical comparators.

Barry Controls Inc., Watertown, Mass., appointed as distributors of its line of machinery mounts: Die Supply Co., Cleveland, a division of E. W. Bliss Co., Canton, O.; General Factory Supplies Co. Inc., Cincinnati; General Rubber Co., Milwaukee; and Johnson Tool & Supply Co., Des Moines, Iowa.

ASSOCIATIONS

Henry R. Hanson, vice president, Wm. K. Stamets Co., Cleveland, has been elected president of **American Machine Tool Distributors' Association**, Philadelphia.

Harold A. Daschner has been appointed managing director of the **Pressed Metal Institute**, 3673 Lee Road, Shaker Heights, O. He replaces O. B. Werntz, who retired Jan. 1 to spend full time on his regular work as executive vice president, **National Screw Machine Products Association**, Cleveland.

E. Harold Mitchell, Detroit, has been appointed field director, **Gray Iron Founders' Society**, Cleveland. He was sales engineer for Weatherhead Co., that city.

NEW ADDRESSES

Steel Supply Co. moved its warehouse to larger quarters (with more modern equipment) at 3977 N. 25th Ave., Schiller Park, Ill., a suburb of Chicago.

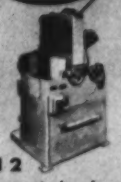
Electro Data Corp., maker of electronic computers, moved to a 40,000-sq-ft plant at 460 Sierra Madre Villa, Pasadena, Calif.

Inland Steel Co. moved its Kansas City district sales office to Dwight Bldg., 1004 Baltimore Ave., Kansas City 5, Mo.

Campbell Abrasive Cut-off Machines

ACCO products

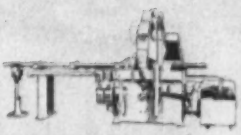
There is a CAMPBELL Abrasive Cut-Off Machine to handle ALL SIZES of high-alloy steel– quicker, cleaner, and more economically



Model 2
Hand-operated submerged cutting machine with 4" diam. capacity.

Model 15
Hand-operated wet or dry machine. Max. cap. 1" diam. solid, 2" tubing.

Model 223
Hand-operated bar cutting machine. Cap. 2" diam. solid, 4" tubing.

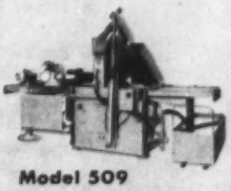


Model 476
Wet abrasive cutting machine with capacity to cut 6" diam. solids.

Model 265
Hydraulically-operated with capacity to cut 2" diam. solid, 4" tubing.

Model 480
For wet abrasive cutting stock to 8" diam. solids.

Model 302
Horizontal wet abrasive cutting machine for flat or irregular shapes.



Model 509
Rotary-oscillating-hydraulic wet abrasive machine. Cuts tubing to 9" diam.

Model 406
High-speed machine with capacity to cut 6" diam. solids in seconds.

Check these CAMPBELL Features

- Quality cuts—free from surface hardening
- Cut-off lengths held to close tolerances
- Cuts exceptionally smooth and burr-free
- Subsequent milling or grinding eliminated
- Accuracy of abrasive cutting reduces scrap loss
- Quick, accurate cutting brings high production
- CAMPBELL Engineers will run tests for you

Send for DH-301 "Principles of Abrasive Cutting"
Find out what a CAMPBELL Abrasive Cutter can do for you

ACCO
TRADE MARK

Campbell Machine Division
AMERICAN CHAIN & CABLE
925 Connecticut Avenue, Bridgeport 2, Connecticut

Better Value

Lay Your Tooling Worries on Our Doorstep

Stop tearing your hair out over tooling problems. Take the fast, dependable, easy way out. Take it to Taft-Peirce. Here, one source with one responsibility . . . and years of experience in making tools, jigs, fixtures and gages of all kinds . . . is your best guarantee of quick, effective tooling.

That's one reason why the Australian Government asked Taft-Peirce, a few years ago, to make all the tools for a new aircraft engine to be built in their country.

Incidentally, we're just the slightest bit proud that not one tool or fixture was rejected out of more than a hundred. Most likely the reason why they asked us to repeat not too long ago.

Tooling is a specialty with us. Our creative tool design and manufacturing departments are at your service. Get the full facts. Send for our 92-page booklet, "Take It To Taft-Peirce".

We'll Design It . . . Some typical design assists by T-P engineers — a silent typewriter, automobile engine, automatic lens grinders, countless machine-tools and smaller mechanisms.

Tool It . . . Several large corporations rely exclusively on the T-P Toolroom for tool design and manufacture.

Make It . . . 1500 machine tools . . . 450,000 square feet of plant — provide the facilities for anything from a single simple part to thousands of complex units.

Test It . . . A separate production line may be set up in sequence operation — from manufacturing through assembly, test, and final inspection.

Ship It . . . Taft-Peirce offers you all or any part of these services.

For Engineering, Tooling, Contract Manufacturing

TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R. I.

TELEPHONE: WOONSOCKET 1

8

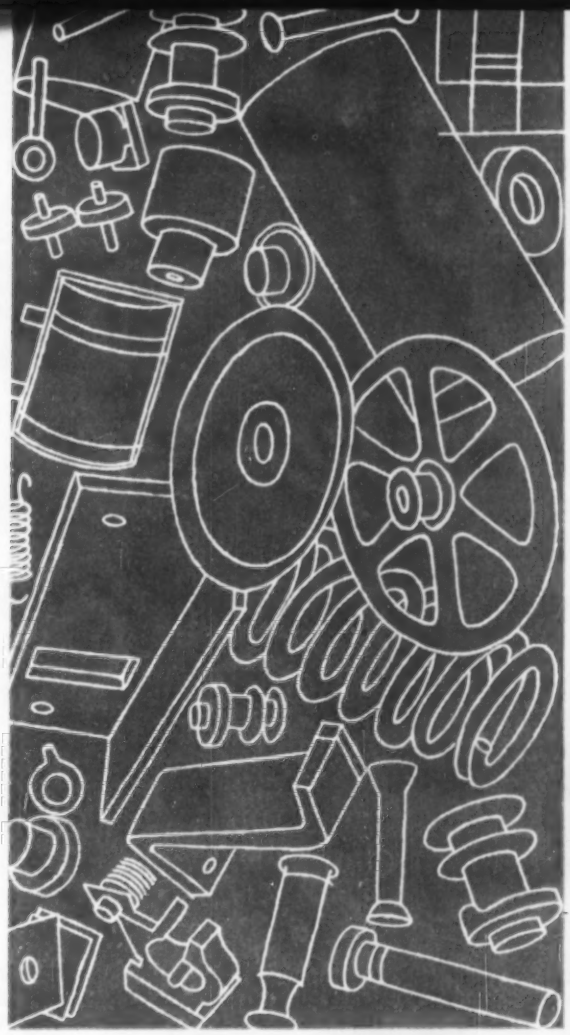
STEEL's 1955 Management Series . . .

The editors of STEEL herewith present the eighth in their ten-part series, Program for Management for 1955. The complete list:

1. **Product Communication** (Feb. 14, p. 73)
2. **Cut Costs To Preserve Profits** (Mar. 14, p. 93)
3. **Better Plant Layout** (Apr. 18, p. 93)
4. **Business Communication** (May 16, p. 103)
5. **When To Re-Equip** (June 20, p. 99)
6. **Put Business Trends To Work** (July 18, p. 93)
7. **Business Consultants** (Aug. 15, p. 123)
8. **Value Analysis** (Sept. 19, p. 101)
9. **Market Facts** (Oct. 24)
10. **Keep Your Product Growing** (Nov. 14)

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *Penton Bldg., Cleveland 13, O.*

No. 8 in 1955 Management series



Value Analysis:

Equal or better performance at lower costs

INDUSTRY'S NEWEST specialist has dollar signs for eyes, wears a Sherlock Holmes hat and diplomat's striped pants, comes equipped with an insatiable curiosity and hasn't learned the meaning of "it can't be done."

His title: Value Analyst.

His achievements: For a Chicago company he lopped $185,000 off the annual price tag for steel —yet he did not cut down on the amount of steel the firm uses.

In a New York plant he recommended the use of a forging instead of a weldment in a compressor component and saved the firm $150,000 per year.

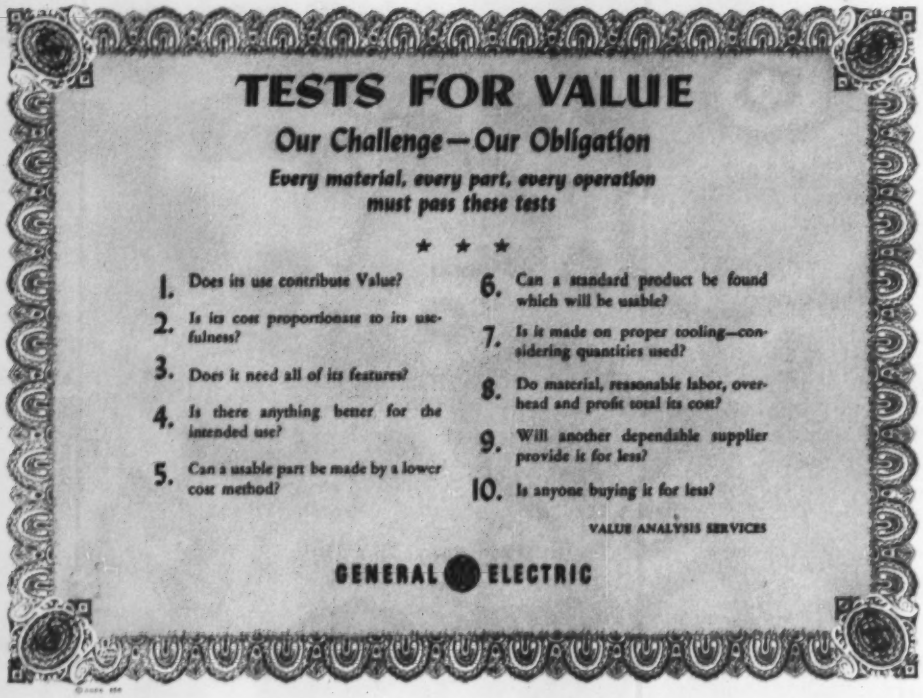
In another plant he suggested redesigning a machined component so that it could be produced as a stamping. Savings were $39,000 a year.

Definition

Although value analysis has a variety of names (purchase analysis, value engineering, cost and engineering analysis), simply defined it is: A *creative* study of every item of cost in the parts or materials you use.

Value analysis is not a substitute for the engineering and manufacturing cost reduction work being done by every progressive company. It's a supplement — it focuses the attention of engineering, manufacturing and purchasing on one objective: Equal or better quality, or performance, at lower cost.

L. D. Miles, General Electric Co.'s manager of value analysis, challenges industrial management with this thought: "On the average, one-fourth of the manufacturing cost is unnecessary. The extra cost continues because of patterns and habits of thought, because of personal limitations, because of difficulties in promptly disseminating ideas, because to-


TESTS FOR VALUE
Our Challenge—Our Obligation
Every material, every part, every operation must pass these tests
★ ★ ★
1. Does its use contribute Value?
2. Is its cost proportionate to its usefulness?
3. Does it need all of its features?
4. Is there anything better for the intended use?
5. Can a usable part be made by a lower cost method?
6. Can a standard product be found which will be usable?
7. Is it made on proper tooling—considering quantities used?
8. Do material, reasonable labor, overhead and profit total its cost?
9. Will another dependable supplier provide it for less?
10. Is anyone buying it for less?
VALUE ANALYSIS SERVICES
GENERAL ELECTRIC

GE certificate helps promote value analysis

day's thinking is based upon yesterday's knowledge."

Companies have been surprised by the immediate effectiveness of their value analysis programs. Carrier Corp., Syracuse, N. Y., entered its program in September, 1953, with one purchase analyst. By the end of the year, his cost-cutting ideas had saved $96,000. Last year, Caterpillar Tractor Co., Peoria, Ill., saved over $1 million from ideas generated in its engineering and cost analysis division. GE's program was started in 1947. Its first project saved 30 cents per unit. This amounted to an annual savings of $300 000. Now it's a multimillion dollar saving operation.

Responsibility

How do you set up a value analysis program? What responsibility is involved? Where does authority begin and end?

A look at some of the more successful programs in metalworking will suggest methods for tailoring a program to fit your organization.

Value analysis usually comes under the purchasing arm rather than engineering or manufacturing. There are sound reasons for it: 1. By nature, purchasing is cost conscious. 2. Purchasing is a company's most active contact with the outside industrial world —its new ideas, methods, materials and products. 3. Purchasing's position as a clearing house for all requisitions of parts and materials gives it a more sweeping knowledge of over-all plant activities.

This does not mean that the buyers and purchasing agents take on a "second activity" as value analysts. Most exponents believe that to do an effective, creative job, the value analyst should not be handcuffed with buyer routines —interviewing salesmen, negotiating contracts and handling accompanying paper work. The value analyst should have a full-time job of "brain-sweating," hard study and follow-through with engineering, manufacturing, purchasing and outside suppliers.

Not all companies with successful value analysis programs feel that a "specialist" is necessary. Allis-Chalmers Mfg. Co., Milwaukee, and Rheem Mfg. Co., Chicago, favor the committee aproach.

Group Thinking

A value analysis committee, formed of members representing manufacturing, engineering and purchasing, meets regularly to explore avenues for cost cutting. Generally, projects are programmed and assignments for investigation are delegated to members in their fields.

If you're considering the committee approach: 1. Be sure that the committee meets regularly. 2. Be sure committee members are key men with authority to make decisions. One of the aims is to close the gap between the conception of an idea and its adoption. Using junior men who must wrestle with red tape through "proper channels" will defeat the purpose of the program. 3. Be sure committee members can devote adequate time to the program. The

biggest hazard will be that the members will not have enough time to do a good job. If necessary, reduce some of their lesser responsibilities.

By its nature, value analysis will fail if the utmost in interdepartmental co-operation is not achieved. Assigning authority to the analyst is a critical consideration. In most companies, the value analyst is directly responsible to the director of purchases. His function is in a staff rather than line capacity. He has no direct authority over purchasing, engineering or manufacturing activities.

The value analyst's only capacity should be to study, recommend and advise. But in this role he should be assured full co-operation in carrying out his responsibilities. Final authority for the adoption of his recommendations should rest with the departments directly affected.

Striped Pants

Twin keys to a successful program are the organization of the program and the selection of personnel. But, first of all, a value analyst must be a diplomat. In practically every job he undertakes he will be treading upon prior decisions and judgments of others. It takes top skill in human relations to create the proper atmosphere for an effective value analysis program.

For peak effectiveness, the value analyst should have few strings limiting his areas of operation. He'll be crisscrossing departmental lines searching out all the facts of his cost-cutting problem. Here are the guideposts of his work:

1. Is it possible to eliminate or simplify the part?
2. Can it be altered so that a high-speed method of production can be used?
3. Can it be altered so that standard parts or materials can be used instead of high-cost specials?
4. Is a design change practical to permit automatic assembly rather than hand assembly? Will a design change lower material costs?
5. Will a lower-cost material do the same job? Or will a higher-cost material enable cost savings in other phases of production?
6. Are correct fabrication methods being used?
7. Is the best supplier for this part being used?

Areas of Operation

The major areas of his operations, with some examples, include:

Materials Substitution — New technology and changing prices are big factors here. The new leaded steels, for example, are paving ways to cost cutting. A Chicago value analyst found that even though leaded steel costs more initially, the savings in machine time substantially reduce the cost of the end item. A. C. Gilbert Co., New Haven, Conn., discovered that by using tin plate rather than electrozinc plated steel for its model train track it could save $40,000 per year.

Check your postwar cost comparisons between castings and forgings. Chances are that you will find that the price fluctuations in the last ten years would

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Meet Mr. Value Analysis

VALUE ANALYSIS at General Electric was conceived in 1947 to solve a problem.

As at many companies, GE's first emphasis had been basically to accomplish new engineering advances—create new products, make existing ones work better or last longer. But officials became concerned with the almost continuous increase in costs. Benefits from new and better products could not accrue if people couldn't afford to buy the products.

So the target was drawn: Equal performance at lower cost. The job of developing a program to hit the mark went to L. D. Miles. With a small group of engineers, he has developed GE's value analysis methods and techniques which have eliminated millions of dollars in "wasted" costs from GE products.

In recognition of his accomplishment, Mr. Miles received the Charles A. Coffin award in 1950. It is GE's top honor to employees, presented for outstanding achievement.

Mr. Miles joined GE in 1931 after graduating from the University of Nebraska with an electrical engineering degree. Assignment as a design engineer followed, but his "value consciousness" became recognized and in 1938 he was transferred to the purchasing department as a purchasing engineer. His last post before heading up the value analysis program was purchasing agent for GE affiliate, Locke Insulator Corp., Baltimore.

What does a busy executive like Larry Miles do for diversion? "Our home has been the victim," he says. "With my son, I have used 40 truckloads of rock to build decorative retaining walls in our yard. In the winter I go inside to build such features as entire swinging walls, rooms with no furniture, game rooms with a raised hearth fireplace, etc."

Value Analysts Need These Qualifications

1. Background in engineering, plus practical experience in production and/or methods and cost analysis.
2. Creative imagination.
3. High degree of initiative, self-organization and drive to start and follow projects through to completion with little or no supervision.
4. A sense of value.
5. Mature personality, stable and not easily discouraged.
6. Desire and ability to work with others.

have made it worth your while to switch from one to the other and back again.

Design—Here's an area of tremendous potential because of the value analyst's day-in-day-out contact with a variety of products. He also is exchanging ideas with in-plant and supplier personnel. In one case, GE analysts found that a spring it was using had a special hook on one end. With a simple design change in the component, a spring with standard hooks on both ends could be used. Spring cost dropped from 9 to 3 cents per unit.

One big opportunity in this area is to stop high-cost factors in a product before it gets to the production line. A policy of submitting drawings and specifications to the value analyst before a design is frozen will pay dividends. The analyst probably won't catch all the cost reduction possibilities, but a batting average of only 10 per cent is certainly worth-while.

Production—With its ever present "make or buy" considerations, production is a fertile field for the value analyst. An East Coast analyst found that a small plug was being made in his plant on special order because it was a low volume item. It required special machine setup time, as well as time on a machine that could be used to produce something else. Cost: $15 per unit. He found he could buy the part for $3 a unit.

Old, But Good

Standardization, one of the old cost-cutting favorites, is a natural for the value analyst. At Stewart-Warner Corp., Chicago, the standardization program in many ways parallels most value analysis programs. The company's first standardization activity was applied to all purchased items and materials.

Paul Godfrey, standards engineer, found a $185,000 savings by simply revamping steel purchasing practices. He analyzed each type bar, tubing, wire and sheet purchased, asking: 1. Does it fit the general commercial standards as to size, type, grade, etc.? 2. Are we using two or more materials to do the same or nearly the same job?

This table indicates how the number of items purchased was reduced:

	Number of Types	
	Before	After
Carbon bar	230	136
Alloy bar	46	29
Stainless bar	31	15
Carbon tubing	90	57
Low carbon wire	68	35
High carbon wire	61	37
Flat steel	146	42

Result: The number of different steel items purchased decreased from 672 to 351. The $185,000 saving represents direct costs only. Intangibles like inventory, less paper work, etc., are not included.

Suppliers, too, can help you here. Pheoll Mfg. Co., Chicago fastener maker, is pushing a fastener standardization program among its customers. Pheoll engineers studied an appliance maker's fastener requirements and were able to suggest ways to cut the variety of fasteners used from 2000 to 1300. Fastener bill savings: 11 per cent annually.

Campaigning — Pheoll wants to standardize fasteners among its customers and throughout the industry. "Savings," say company officials, "go beyond the price of the fasteners."

1. Purchasing — with the same total, but fewer types, larger orders of each type mean quantity discounts. Overhead is reduced; fewer orders mean less paper work.

2. Inventory—fewer types and sizes save on storage requirements, mean fewer control records and reduced clerical detail, less time in checking and inspecting stock.

3. Production — more general-purpose fasteners increase interchangeability and flexibility. Assembly is simpler, faster. There is

less chance of a production tie-up due to fastener shortages on the line.

Traffic costs are another great potential field for savings. Because of his integration with all departments, the value analyst often can uncover cost-cutting possibilities that the traffic manager might not be able to spot. For example: Several production departments may be ordering different items from the same geographical area. Each specifies a different delivery date which the traffic manager must meet. The analyst, by checking into warehouse facilities, inventory control and production scheduling might find ways to consolidate several shipments to cut costs. Allis-Chalmers did just that in one of its plants and saved $170,000 annually. In the company-wide transportation check, A-C saved over $350,000 on its shipping cost in 1954.

Packaging and materials handling, too, are within the realm of the value analyst. Rheem analysts investigated a packaging project involving corrugated cartons and found a method of saving 15 per cent annually. Another company had been purchasing a chemical in solution. Its value analyst saved $10,000 annually by suggesting that it be bought in powder form.

Suppliers Are Good Allies

The analyst can expect most of his ideas and innovations to originate directly or indirectly from suppliers — if company relations with them are right.

Suppliers are generally specialists—it's only natural that their know-how on specific items is often superior to that of your engineering staff whose primary consideration is the end product. That's why more and more companies, in submitting specifications to suppliers for bids, are asking for suggestions on cost reduction and quality improvement.

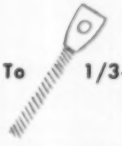
A factor frequently overlooked is that suppliers often have a "standard" line of items; that your specifications call for a special. Carrier Corp. was using a tape which the value analyst discovered the supplier was making as a "special." There was a "standard" which would do the job as well or better. Savings from switching to the "standard": $14,000 annually.

To your buyers, a value analyst can provide two important services: 1. He can act as watchdog over price fluctuation between sup-

Value Analysis Ideas Like These Have Saved Millions at GE

From 3½-c Screw Machine Item To 1½-c Upset Blanchard Ground

Reduction: $40,000 a year

From 8c Assembled Screw Machine Parts To  1/3-c Standard Spade Bolt

Same performance for 1/20 of cost

From $2.25 Special Aluminum Knob To 25c Standard Plastic-Metal Knob

Save 9/10 of cost

From $1.02 Aluminum Diecasting To 60c Deep Drawn Steel Stamping

Savings: $31,500 a year

Here's what the value analyst checks in . . . Make or Buy Considerations

1. Cost studies show it'll be cheaper for us to make it.	Yes	No
2. Making it fits our know-how, equipment and tradition better than it does the supplier's.	Yes	No
3. We have idle capacity to absorb overhead.	Yes	No
4. Design of the part or process is confidential.	Yes	No
5. Making will facilitate our control of parts changes, inventories and deliveries.	Yes	No
6. Do we want to depend on an outside source of supply?	Yes	No
7. Is the volume large enough to justify investment in new equipment to produce the part?	Yes	No
8. Are there major labor implications—would labor rates for production of this item be comparable to rates for our existing products? Will we have to increase our labor force?	Yes	No

Source: Worcester Pressed Steel Co.

pliers. 2. He can supply accurate cost estimates for new models.

Caterpillar Tractor's analysts make quarterly comparisons of costs. When major variances are discovered, the buyer is contacted to determine whether it's a buyer problem or one for the analyst.

Setting Up a Target

At Ford Motor Co., Dearborn, Mich., the purchase analysis department supplies buyers with a cost range on all new models and products coming up for purchase. The buyer tries to purchase the part within that range. If unsuccessful, purchase analysis will review its estimates. If it's sure of them, purchase analysis may join the buyer in getting together with the supplier in an effort to meet the price objective. Often Ford specialists can spot cost-cutting possibilities in the supplier's plant which help him meet the price.

The shoe fits on the other foot, too. A supplier has the opportunity to come to Ford for an economic increase or review if he feels he is losing money on his product. The goal always is to keep prices down, but if a legitimate increase is warranted, the adjustment is made.

Some suppliers have felt that value analysis programs have been a method for the buying company to "look down their throats." Experience proves otherwise. Hobart C. Ramsey, Worthington Corp. chairman, told the National Association of Purchasing Agents in New York: "No company wants to buy below a supplier's costs—he'd be out of business when we need him most."

Think This Over

If you are a supplier, there's food for thought in this quip by a small metalworker who had a worth-while confab with a customer's value analysts: "Where else can you get such high-priced consultants—free!"

Be sure all supplier suggestions are given proper consideration if you have a value analysis program under way. If his suggestion takes a long investigation, give him a progress report. Always make a final report when a decision is made on the suggestion—even if it is turned down. The best way to discourage cost-cutting suggestions from suppliers is to make them feel that you are ignoring the ones they've already submitted.

How big a value analysis program do you need to do an effective job? R. E. Jones, purchasing agent at A. C. Gilbert Co., says: "A value analysis section is a fundamental part of the basic structure of modern purchasing, regardless of the size of the company."

Gilbert has an annual purchasing bill of about $8 million. Its purchasing staff includes a purchasing agent, assistant purchasing agent, two buyers, a value analyst and clerical help. In the last six months, the value analyst's batting average was slightly under 0.500 per cent—explored were 70 major and minor projects; 25 were accepted and resulted in $70,000 annual savings; 21 were rejected; 24 are pending.

Caterpillar's engineering and cost analysis division has eight

people. General Electric has seven key men in its central value analysis group who conduct value analysis training seminars for men in other departments. Among other training factors, supplier personnel are given the opportunity to describe their products and skills. After training, value analysis specialists in units from one to five are put in product departments to provide value analysis services and make specific product studies.

The Navy, which set up a program last year, has a director and an assistant director of value engineering, plus ten civilian engineers. Operating out of the Bureau of Ships Office, Washington, the civilians are divided into two-man teams. They specialize in five phases of engineering dealing directly with shipbuilding. On the job, they work with four and five-man value engineering staffs at Naval shipyards.

The Payoff

What kind of results can you expect from a value analysis program? As a rule you save $15 for each dollar invested. The Navy estimates its savings at $20 to $1. Most programs are comparatively new and the initial cost reductions appear high. But most officials feel that on the long-range operation, an $8 to $1 ratio will be about standard for an effective and rewarding value analysis program.

Like every other activity in an industrial organization, top management has to be sold. Case histories, plus spectacular savings which usually emerge shortly after a program gets under way, make it fairly easy to get management to agree to "at least give it a try."

Keeping the program sold, not only to top management but to all key personnel involved, is a necessity. Again, this is where "human engineering" comes into play. GE and the Navy have found that there can be no "flag waving" or "glory grabbing" by the value analysts—it's their job to find cost-cutting ideas by assisting engineering, production and purchasing. The Navy's basic policy is that the credit for the savings goes to the line engineer

Allis-Chalmers Uses Committee Approach

Members include representatives from foundry, manufacturing, engineering and purchasing; the chief engineer is chairman. A machine may be torn down to its smallest part to study the function, material used, manufacturing method or purchasing practice for each item. Assignments are made to those in the field where an investigation may fall. Findings are reported, and the committee determines what cost-cutting steps, if any, should be taken. Part of A-C's informal program in value analysis is for the buyers to obtain new quotations daily or set up meetings between suppliers and company officials to discuss new materials, products, methods and specifications. Periodic visits by A-C personnel to suppliers' plants to exchange cost-cutting ideas are also stressed and have proved profitable.

Follow these 6 steps to put . . . value analysis in action

1. INFORMATION . . . Collect all pertinent facts—costs, quantities, vendors, drawings, specifications, manufacturing methods.

Discuss the problem with the engineer to develop a thorough understanding of the product or service involved.

Determine the amount of effort that should be reasonably expended on each item of cost.

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2. SPECULATION . . . Generate as many solutions as possible. Consult with others who might help.

Systematically explore materials, processes, rearrangement of parts, etc.

Put your imagination to work; record every solution that seems remotely possible.

---

3. ANALYSIS . . . Evaluate each idea carefully, sifting out the impractical.

Estimate the dollar value of each idea.

Select the most promising and set up a program to pursue each vigorously to conclusion.

---

4. PROGRAM PLANNING . . . Break the job down into a progression of functional areas—such as fastening job, support job, electrical contact job, etc.

Select a top specialist in your company to consult on each phase.

Select two or three of the best suppliers in the country for each functional area of the product.

---

5. EXECUTION . . . Point out the top function desired; discuss the problems and solicit suggestions from company and supplier specialists.

Stick to each promising suggestion until tangible, usable results are reached.

---

6. SUMMARY AND CONCLUSION . . . Issue a complete, concise summary of the status on each part which shows possibilities.

Send copies to the man designated by the manager to receive and follow up the suggestions.

Complete the job promptly and go to the next.

---

making the decision to put the cost-cutting suggestion into effect —not the value engineering office.

To develop "value thinking" among all key personnel, GE distributes small thought-stimulating cards describing specific examples of "how value specialists are helping all of us to do our jobs better." Briefly shown are: The description and drawing of the part, what the cost-cutting feature was, total savings, name of assisting supplier source if there was one, where additional information may be secured.

By-Product

A not-to-be-forgotten factor in value analysis programs — they have training potential. Although Caterpillar Tractor's engineering and cost division is not designed as a training program per se, several members have left the division to become buyers.

"What better training could they have had," comments T. M. Logan, who set up the division. "They have gained a knowledge of markets, dealt with suppliers, become better acquainted with processes and materials in their contacts with production men—and they have gained a better understanding of design."

Bigger Billing

Value analysis programs are going to play an increasingly important part in industry, Mr. Logan and most experts in this field predict. There are two big reasons: 1. Industrial organizations are getting more complex. 2. It's getting more difficult for any one individual to keep pace with all the technological developments in his field.

More and more companies are checking value analysis programs to fill the breach. In today's increasing industrial complexity, the distance between the concept of an idea and its adoption as a profit-making application is widening. Because of this, fewer ideas are being developed, claims metalworking management. Value analysis is one answer to the problem.

It's worth investigating.

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C.P.C.*

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*Clearing Productivity Consultants, working with Lukens Steel Company engineers, developed the 5,000 ton hydraulic press shown here to put the straightening process on a more productive basis. The giant machine has a flexibility of operation and simplicity of control usually associated with only the smallest units of its kind. A unique feature is the movable press ram which, in conjunction with motorized cars, makes all areas of the plate easily accessible for straightening. The cars and ram are operated from the pulpit-like control.

Few people have a problem like this particular one, but all companies are constantly faced with the critical problem of increasing productivity. If you're looking for a more efficient way to do a job with power presses, call in one of Clearing's specialists. There'll be no obligation.

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Write for Bulletin GR-100

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Write for Bulletin ER-107

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1431

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STEEL

September 19, 1955

Technical Outlook

CHANGE IN PRACTICE?—U. S. Bureau of Mines reports good quality pig iron, low in sulphur, has been produced in an experimental blast furnace using a blend of 40 per cent anthracite coal and 60 per cent coke from bituminous coal. This is the highest percentage of "hard" coal used in a blast furnace in modern times—charges seldom exceed 10 per cent, and then chiefly during coke shortages.

PROTECTION—Two ways of preventing aluminum corrosion in water at high temperature have been developed at AEC's Argonne National Laboratory. One incorporates ½ to 1 per cent nickel and iron in aluminum to make an alloy that resists penetrating corrosion up to at least 660°F. The other is based on addition of small amounts of nickel sulphate to the water made acidic with sulphuric acid. This protects commercial aluminum up to 530°F.

NONMETALLIC MAGNETS—A lightweight, permanent ceramic magnet contains no critical materials, like cobalt or nickel. It has a coercive force of 1600 oersteds, weighs only 0.18 lb per cu in. and is suitable for gages, couplings, filters and instruments. Cost is low.

FREE-CUTTING PLATE—Leaded steel is available in plates. It has the free-machining qualities of leaded bar stock and weldability superior to high-sulphur, free-machining plate, the supplier claims.

POINTERS—In talking about types 201 and 202, the new nickel-saving stainless steels (STEEL, Sept. 5, p. 133), Allegheny Ludlum points out that substitution of manganese for nickel reduces the resistance to oxidation at elevated temperatures. For this reason, it is not recommending 202 for use at temperatures above 1500°F in oxidizing atmospheres.

The new alloys are somewhat stronger in the annealed state but work harden about the same as their counterparts with more nickel (types 301 and 302). The usual tool and die setups can be used. The high manganese stainless may be more rapidly attacked in pickling.

IDENTIFICATION—Decals of anodized aluminum foil make name plates that stick tight without rivets or other fasteners. They are fast and easy to apply; the adhesive bond is described as "permanent."

COST CUTTER—Metal channels pressed from flat stock offer design flexibility. The method allows size and material changes without expensive dies, says Youngstown Steel Car Corp. They can be made in a wide range of sizes, in close tolerances, to buyer's specifications.

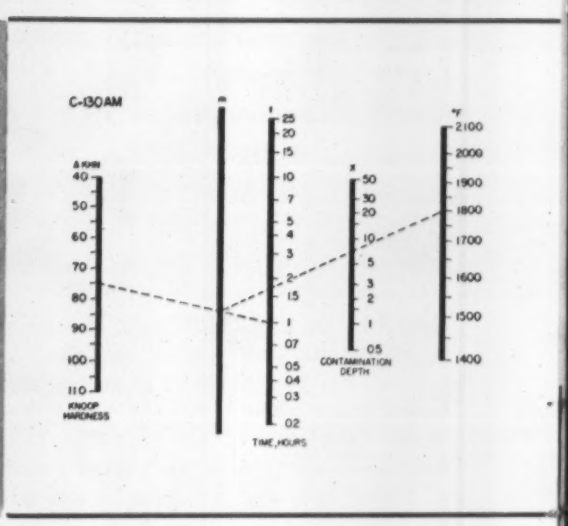
MACHINABILITY—The American Society of Tool Engineers is trying to pin down machinability. Its goal: Test standards and procedures that will assure better than the present 70 per cent reproducibility. Another activity is a metal cutting bibliography going back to 1943. Listings and abstracts are to be compiled so that they can be searched by electronic business machines. The John Crerar Library, Chicago, will do the work.

RECTIFIERS—Silicon is edging a little farther into the power rectifier picture. Westinghouse announces diodes capable of handling 200 volts and 40 amperes with forced cooling. That puts silicon rectifiers in line to bid for welder and plating line jobs.

Metalworking Outlook—p. 53 Market Outlook—p. 147

Table 1—Critical Hardness Levels for Titanium Alloys

Alloy	Knoop hardness: Uncontaminated level	Critical level	Permissible increase	Longitudinal and transverse bend ductility
C-130AM	275	325	50	good
	275	350	75	poor
	275	375	100	poor
RC-55	150	200	50	good
	150	225	75	fair
	150	250	100	poor
A-110AT	225	275	50	good
	225	300	75	good
	225	325	100	poor



Avoiding Titanium's Allergy to Air

By G. J. WILE
Jet Engine Dept.
General Electric Co.
Evendale, O.

TITANIUM IS ALLERGIC, too. The sensitivity shows up in poor mechanical properties, especially low ductility.

Frequently, the cause is interstitial contamination caused by heating in air before hot working. That means we must establish safe time-temperature combinations for forging and hot forming. The problem becomes particularly important when a thin structural shape, such as a jet engine compressor blade, must be precision formed at forging temperatures.

Study — General Electric Co. asked Battelle Memorial Institute to obtain contamination data and to establish useful correlations with time and temperature. As a starting point, the investigators (J. E. Reynolds, H. R. Ogden and R. I. Jaffee) established critical Knoop hardness levels under 200 gram loads. Their criterion for critical hardness was bend ductility—measured transversely and longitudinally. (Table 1).

For each hardness level, an equation was developed for depth of contamination as a function of time and temperature. Measurements of microhardness as a function of depth of contamination are summarized in the nomographs for Rem-Cru titanium A-55, C-130AM and A-110AT.

Problem Solver—How curves of depth of contamination for various temperatures and times (Fig. 1) can be used to solve a practical problem is illustrated in the following example: Compressor blades are to be forged from titanium alloy, C-130 AM. Typical forging procedure is illustrated in Table 2. With this procedure, will harmful contamination of the blade occur?

Assumptions made: Good longitudinal and transverse bend ductility is desired. This means a hardness increase not greater than 50 Knoop. The temperature of 1700°F and the 5 minute forging periods include preheating, transfer and working. The blade is at a temperature of 1700°F for 25 minutes.

The silica sand blast removes 0.5 mil from the blade surface. Trimming removes edge and corner contamination. Since surface metal is lost during intermediate cleaning, computation must account for this loss. With this to go on, we can follow the procedure illustrated in the box.

Use the Curve—The computation is carried out conveniently on the graph of the contamination curve. In the example, (Fig. 1) arrows trace stages of forging.

Certain limitations should be observed. The curves use data extrapolated from the nomographs (Fig. 2) and the precision of such extrapolations has not been veri-

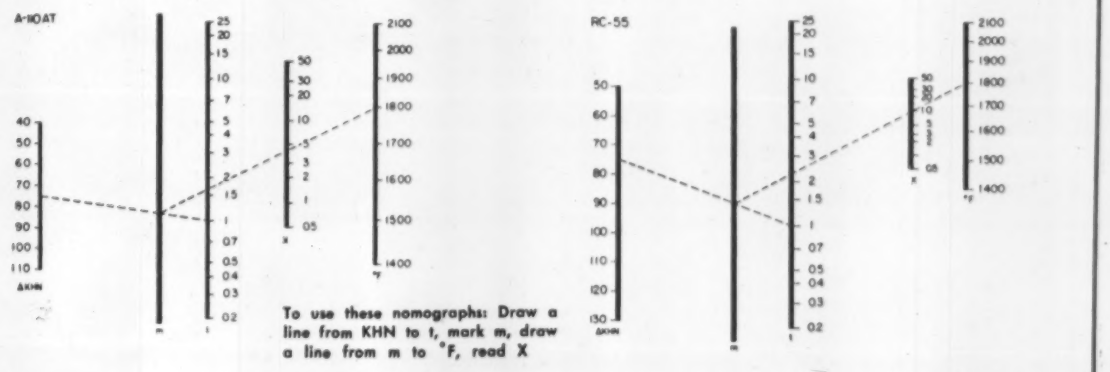


Fig. 2—Nomographs for estimating depth of air contamination of titanium during forging

Table 2—Typical Titanium Forging History

1.	Heat to 1700°F and forge	5 minutes
2.	Reheat to 1700°F and forge	5 minutes
3.	Sandblast, removing 0.5 mil	
4.	Reheat to 1700°F and forge	5 minutes
5.	Reheat to 1700°F and forge	5 minutes
6.	Sandblast, removing 0.5 mil	
7.	Reheat to 1700°F and forge	5 minutes
8.	Trim and polish, removing remaining contaminated metal	

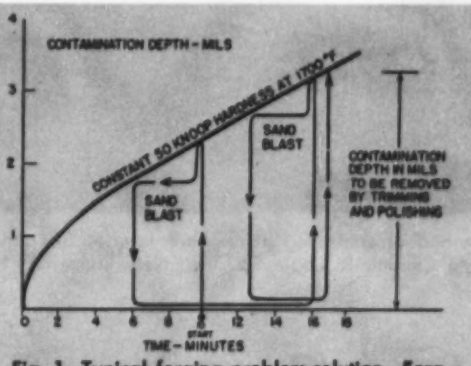

CONTAMINATION DEPTH - MILS
CONSTANT 50 KNOOP HARDNESS AT 1700°F
SAND BLAST
SAND BLAST
CONTAMINATION DEPTH IN MILS TO BE REMOVED BY TRIMMING AND POLISHING
TIME - MINUTES

Fig. 1—Typical forging problem solution. Forging and cleaning pattern plotted on air contamination curve of C-130AM

fied. To make your own curves, you may need to extend the time line on the nomographs, keeping the same logarithmic scale.

If and But—All values were obtained from tests on cylindrical specimens. Edge effects were eliminated. In addition, the data would not apply directly if contamination extended from opposite sides to the center of the part. However, these limitations probably will not detract in most cases from the usefulness of the data.

The important thing is that the method substitutes precalculation for cut and try, and has proved to work in shop practice.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, Steel, Penton Bldg., Cleveland 13, O.*

Procedure for Foiling Titanium's Air Contamination Allergy

1. From the hardness curve of C-130AM at the end of the first 10 minutes of heating and working at 1700°F, depth of contamination is found to be 2.3 mils. Thus the depth at which the hardness level has increased 50 Knoop.

2. In the next step, 0.5 mil is removed by sand blasting. This has the same effect as reducing the time of contamination. For convenience, this is termed "equivalent time," which the curve shows as 6.1 minutes.

3. The next two steps add 10 minutes at 1700°F, bringing total time to 16.1 minutes and contamination depth to 3.2 mils.

4. Following sand blast removal of an additional 0.5 mil, the equivalent time becomes 12.3 minutes.

5. The final 5 minute step brings the total time to 17.3 minutes. The contamination depth corresponding to 17.3 minutes is 3.3 mils. This represents the amount of material that must be removed by final polishing if the surface of the blade is to have the desired mechanical properties.

6. As the removal of 3.3 mils by polishing probably is impractical, the procedure must be revised to remove more material by sand blasting. A trial calculation will show that if the intermediate sand blast operations remove 1 mil each time from the blade surfaces, the final polishing operation must remove less than 2.5 mils, a more practical figure.

Discharge end of controlled atmosphere furnace for annealing copper tubing at Triangle Conduit & Cable Co. Inc., New Brunswick, N. J.

Surface Combustion Corp

Heat Treating Copper-Base Alloys

By ARTHUR I. HEIM
Research Engineer
Copper & Brass Research Association
New York

WITH EXCEPTION of a few age-hardening alloys, copper-base metals are hardened only by cold work. Heat treatment is used to soften a cold-worked structure or to relieve internal stresses.

Annealing gives softer metal because heat causes recrystallization and grain growth. Heating for stress relief prevents season cracking due to residual stresses. It's done at below annealing temperatures.

Solution treatment and precipitation hardening are used with special types of copper alloys. They contain up to 2 per cent beryllium and perhaps small quantities of nickel, cobalt, chromium or other elements.

Annealing—During cold working, the metal crystals are deformed plastically and elongated in the direction of application of the major stress. Ductility decreases. Strength and hardness increase. If working is continued, the ultimate strength of the metal is exceeded and it fails.

To prevent failure and restore the metal to a condition suitable for further working, it must be softened. This is done by heating to a temperature high enough (called the recrystallization temperature) to cause the formation of new crystals in the metal.

Unfortunately, the recrystallization temperature, unlike melting point, is not a fixed value on the temperature scale. It varies with the amount of cold working. The more cold work the lower it is.

The recrystallization temperature also is affected by the composition of the alloy and type and amount of impurities.

Other Points: Lower annealing temperatures tend to give harder metal after annealing. Greater amounts of cold work before annealing give harder tempers after annealing.

Because of these variables, re-

crystallization temperatures cannot be specified for copper-base alloys. Established commercial annealing ranges are given in table 1.

Two Factors — When copper is heated to its recrystallization temperature, new crystals (grains) are formed. Grains will be small if the time at temperature is short. They grow as time increases. This means two factors are to be considered in annealing: Temperature and time.

Time can be broken down to: 1. Time to reach the annealing temperature. 2. Time at temperature.

Both are important. Unless the furnace charge is heated uniformly, one part may reach the annealing temperature earlier than another. It will remain at temperature longer than the rest of the charge. Grain size in the batch will not be uniform, and properties will differ from piece to piece.

Heat Counts, Too—As temperature goes above that required for recrystallization, grain size increases. Growth is not proportional to the temperature, but it accelerates rapidly as temperature goes up.

Example: Cartridge Brass showed the grain sizes below after heating for 1 hour at temperature indicated:

700°F	0.010 mm
800°F	0.018 mm
900°F	0.035 mm
1000°F	0.050 mm
1100°F	0.082 mm
1200°F	0.155 mm

Those figures show a rapid increase in grain size with a moderate increase in annealing temperature.

Schedule—Ideally, a long anneal at the lowest possible temperature would give the most accurate control of grain size. Commercially, it is preferable to use a high temperature and a short exposure time to get more production through the furnace. Trouble here is that grain size control is much less exact at high temperatures.

This calls for a compromise. The highest temperature and the shortest time which give reasonably accurate grain size control are used.

Why?—Grain size is important because there are degrees of softness. Fine-grained cartridge brass, for example, is not so soft as coarse grained. This is shown in Table II which gives the relation-

TABLE I

Annealing Temperatures for Wrought Copper and Copper-Base Alloys

Name	Nominal Composition (Per Cent) Cu	Zn	Pb	Sn	Other	Annealing Range °F
Coppers						
Electrolytic Tough Pitch Copper	99.90 min.	..	..	..	O 0.04	700-1200
Deoxidized	99.90 min.	..	..	..	P 0.02	700-1200
Oxygen-Free	99.92 min.	..	..	..	..	700-1200
Nonleaded Brasses						
Gilding, 95%	95	5	..	..	..	800-1450
Commercial Bronze, 90%	90	10	..	..	..	800-1450
Jewelry Bronze, 87.5%	87.5	12.5	..	..	..	800-1400
Red Brass, 85%	85	15	..	..	..	800-1350
Low Brass, 80%	80	20	..	..	..	800-1300
Cartridge Brass, 70%	70	30	..	..	..	800-1400
Yellow Brass	65	35	..	..	..	800-1300
Muntz Metal	60	40	..	..	..	800-1100
Leaded Brasses						
Leaded Commercial Bronze	89	9.25	1.75	..	..	800-1200
Low Leaded Brass	65	34.5	0.5	..	..	800-1300
Medium Leaded Brass	65	34	1	..	..	800-1200
High Leaded Brass	65	33	2	..	..	800-1100
Extra High Leaded Brass	63	34.5	2.5	..	..	800-1100
Free-Cutting Brass	61.5	35.5	3	..	..	800-1100
Leaded Muntz Metal	60	39.4	0.6	..	..	800-1100
Free-Cutting Muntz Metal	60	39	1	..	..	800-1100
Forging Brass	60	38	2	..	..	800-1100
Architectural Bronze	57	28	3	..	..	800-1100
Tin and Aluminum Brasses						
Inhibited Admiralty	71	28	..	1	..	800-1100
Naval Brass	60	39.25	..	0.75	..	800-1100
Leaded Naval Brass	60	37.5	1.75	0.75	..	800-1100
Manganese Bronze	58.5	39.2	..	1	Fe 1 Mn 0.3	800-1100
Aluminum Brass	76	22	..	..	Al 2	800-1100
Phosphor Bronze						
Phosphor Bronze, 5%	95	..	..	5	..	900-1250
Phosphor Bronze, 8%	92	..	..	8	..	900-1250
Phosphor Bronze, 10%	90	..	..	10	..	900-1250
Phosphor Bronze, 1.25%	98.75	..	..	1.25	..	900-1200
Free-Cutting Phosphor Bronze	88	4	4	4	..	900-1250
Cupro-Nickel and Nickel Silvers						
Cupro-Nickel, 30%	70	..	..	..	Ni 30	1200-1500
Cupro-Nickel, 10%	88.7	..	..	..	Ni 10 Fe 1.3	1100-1500
Nickel Silver 65-18	65	17	..	..	Ni 18	1100-1500
Nickel Silver 55-18	55	27	..	..	Ni 18	1100-1500
Nickel Silver 65-15	65	20	..	..	Ni 15	1100-1500
Nickel Silver 65-12	65	23	..	..	Ni 12	1100-1500
Nickel Silver 65-10	65	25	..	..	Ni 10	1100-1400
Silicon Bronze						
High Silicon Bronze	96	..	..	..	Si 3	900-1300
Low Silicon Bronze	97.7	..	..	..	Si 1.5	900-1250

TABLE II

How Grain Size Affects Properties of Annealed Cartridge Brass Sheet

Grain Size mm	Yield Strength psi	Tensile Strength psi	Elongation % in 2 in.	Rockwell hardness F	30T
0.100	11,000	44,000	66	54	11
0.070	14,000	46,000	65	58	15
0.050	15,000	47,000	62	64	26
0.035	17,000	49,000	57	68	31
0.025	19,000	51,000	55	72	36
0.015	22,000	53,000	54	78	43

Brass coils weighing up to 3000 lb annealer and cleaning line at Amer

ship between grain size and tensile properties.

Note that the yield strength of cartridge brass having a 0.015-mm grain size is twice that of 0.100-mm grain size. Rockwell hardness is 24 points higher. Elongation is 12 per cent lower. These differences have a great effect on forming.

Decision—Because of these differences in ductility and hardness, the grain size selected for further working depends on the kind of working. If it is severe deformation, the metal must be soft. This means a large grain size is required.

If product appearance is important, a fine grain size is needed to prevent orange peel on bent, formed or drawn surfaces. Since ability to be formed also is required here, a compromise grain size is usually specified with careful control of annealing conditions.

Important Points—Here are four points to keep in mind when deciding on annealing conditions:

1. Copper and each copper-base alloy have a definite recrystallization temperature.
2. It is lowered by increasing cold work.
3. It is raised by other elements, either as alloying additions or as impurities.
4. Grain size can be controlled by temperature and time of treatment. It increases with increase in time or temperature.

Stress-Relief — Residual stress may be caused by rapid or uneven cooling, cold working, machining or similar operations which cause local plastic flow.

In some copper-base alloys (particularly brasses with more than 20 per cent zinc) stresses resulting from cold working can cause season cracking under certain conditions, such as the presence of ammonia in the atmosphere. A stress relief heat treatment prevents it.

Conditions — This treatment is simple. The metal is heated to a temperature below that of recrystallization and held for a predetermined time.

The practice is to use the lowest temperature and longest time that are practical from a production standpoint. Temperatures range from 300 to 650° F, depending on the alloy.

Test—The ASTM mercurous nitrate test gives you a good check on what a temperature-time combination will do. The part is acid dipped, rinsed in cold water and immersed in a solution containing 1 per cent nitric acid and 1 per cent mercurous nitrate. The time before cracking is measured. If there's none in a specified time, the stress relief heat treatment has been sufficient to prevent cracking in service.

Tensile strength and hardness are unchanged by stress relieving, although the elastic limit may be increased somewhat.

Age Hardening—This consists of heating the alloy to a temperature high enough to dissolve the constituent, quenching to retain it in solid solution and then reheating at some lower temperature to precipitate it in a finely divided form. It's possible with any alloy having a constituent more soluble at high than low temperatures.

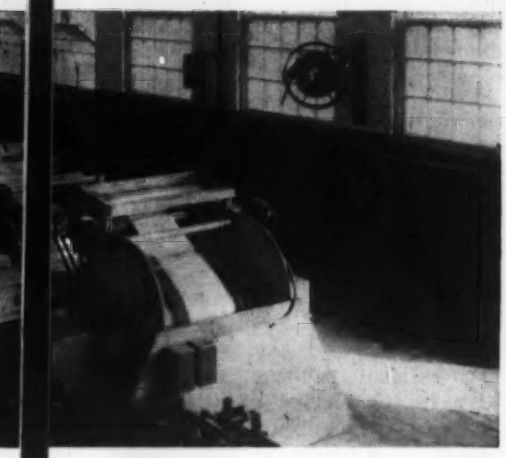
Only a few commercial copper-base alloys are age hardenable. Most widely used is beryllium-copper. Others: Chromium-copper, nickel-phosphorus-copper and several aluminum bronzes.

Procedures and Results—Heat treatments for beryllium-copper vary with the alloy. Those with 2 per cent beryllium are quenched from about 1500°F and aged at 600°F. Those with less than 1 per cent beryllium are quenched from about 1700°F and aged at 850°F.

The common 2 per cent beryllium copper shows an increase in tensile strength from about 72,000 to about 175,000 psi upon aging from the soft condition. Ductility is reduced from an elongation of 50 to 5 per cent.

Electrical conductivity increases from 17 to 21 per cent I.A.C.S. In an alloy with less than 1 per cent beryllium, electrical conductivity can be increased from 26 to about 55 per cent, although this alloy cannot be heat treated to produce strengths so high as the standard alloys.

Chromium-Copper—These alloys have 0.85 to 1 per cent chromium, with or without small additions of



are fed into this continuous strip
ican Brass Co., Buffalo

other elements, such as silicon or silver. They are solution treated at about 1825°F and aged at 900°F.

Aging does not give the strengths obtained with beryllium-copper alloys, but the improvement in electrical conductivity is better. Aged chromium-copper has a conductivity of almost 80 per cent I.A.C.S.—the highest obtainable in a commercial, age hardenable alloy.

Nickel - Phosphorus - Copper—These alloys have about 1 per cent nickel and 0.25 per cent phosphorus. A free-machining grade containing tellurium is produced which has properties similar to the tellurium-free alloy.

They are solution treated at 1400°F and aged at 850°F. The maximum strength reached is somewhat lower than in beryllium or chromium-copper alloys. Electrical conductivity of the aged alloy is 60 per cent. This is higher than for the conductivity grades of beryllium-copper.

Iron-Nickel-Aluminum Bronze — This precipitation hardening alloy contains 10 per cent aluminum, 3 per cent iron and 5 per cent nickel. It is quenched from about 1580°F, aged at 1300°F for 2 hours and air cooled. Tensile strengths of about 110,000 psi (depending on size) are obtained.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.*

TABLE III

Stress Relieving Temperatures

Name	Temperature °F	Time hr
Coppers		
Electrolytic Tough Pitch	300	½
Deoxidized	300	½
Oxygen-Free	300	½
Nonleaded Brasses		
Commercial Bronze, 90%	400	1
Low Brass, 80%	500	1
Cartridge Brass, 70%	500	1
Yellow Brass	475	1
Muntz Metal	375	½
Tin Brass		
Inhibited Admiralty	575	1
Phosphor Bronze		
Phosphor Bronze, 5%	375	1
Phosphor Bronze, 10%	375	1
Cupro-Nickel and Nickel Silvers		
Cupro-Nickel, 30%	475	1
Nickel Silver 65-18	475	1

Note—Soaking time may vary, depending on the mass and cross section of the material

TABLE IV

Age Hardening Heat Treatments For Copper-Base Alloys

Material	Nominal Composition %	Solution Temperature °F	Aging Temperature °F
Beryllium-Copper	2 Be; 0.25 Co	1450-1500	600- 650
Beryllium-Copper	0.5 Be; 2.6 Co	1675-1700	850- 900
Chromium-Copper	0.85-1.0 Cr (with or without Si, Ag, etc.)	1800-1825	900- 950
Nickel-Phosphorus Copper	1 Ni; 0.25 P	1400-1425	825- 875
Iron-Nickel-Aluminum Bronze	10 Al; 3.0 Fe; 5 Ni	1580-1650	1100-1300

1. Time at solution temperature must be sufficient to allow the dissolving constituent to go into solution. It will vary with the mass and cross section of the material
2. Aging time may vary with the mass and cross section of the material. Generally, it ranges from 1 to 3 hours

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

"LAST YEAR'S tax legislation went a long way toward gearing our government's policies on depreciation allowances to the realities of this age of accelerating advances in machine technology."

William C. Newberg, president, Dodge Division, Chrysler Corp., calls the changes in depreciation policy "signal advances." Addressing the American Machine Tool Distributors' Association at its 31st annual meeting, Sept. 5, in Chicago, Mr. Newberg said the changes will "contribute to the forward momentum of our economy in this revolutionary age by encouraging plant expansion and modernization.

"It also is important that the government be forcefully reminded that progress in this respect has only begun.

Backward Look—"In this country the officials of our federal government still tend to base their judgment upon the experience of the past—not upon the unprecedented condition of accelerating obsolescence which we are experiencing. They are inclined to think about how long it used to take tools to wear out—not taking into full account the all-important fact that tools no longer wear out.

"You and I know that almost invariably the tools used by modern industry are replaced by new ones long before they show any serious signs of wear. I think we would all agree that the principal fact governing the depreciation rate of modern machinery is obsolescence. And this fact must be recognized by those who make and administer our tax laws."

Machine tools rushed to completion for the machine tool show will affect this depreciation picture. Advances in machine development were accelerated for the Chicago showing.

Result is that instead of developments coming out on one or two machines at a time, a whole barrage hit the market at once. A host of machines that were good in January are obsolete in September.

Depreciation allowances still fall short of making large-scale replacements attractive. As Mr. Newberg points out, last year's revisions are a beginning. We still have a long way to go.

The machine tool show will be successful just as it stands. But to get a full measure for both the builders and the users, it'll take the support of even better, more liberal amortization policies.

New Officers

Henry R. Hanson, of the William K. Stamets Co., Cleveland, is the new president of the American Machine Tool Distributors' Association. Other officers elected at the association's Chicago meeting: First vice president, Joseph F. Owens Jr., J. F. Owens Machinery Co., Syracuse, N. Y.; second vice president, Frank H. Habicht, Marshall and Huschart Machinery Co., Chicago; secretary-treasurer, J. O. Ellison, Harron, Rickard & McCone Co. of Northern California, San Francisco.

Bending Costs Cut

A new mandrel for bending aluminum tubing costs one-fourth that of regular tools

TUBE-BENDERS at Temco Aircraft Corp., Dallas, are using a ball-type mandrel that costs less, sets up more quickly and forms more efficiently than conventional tools of this type.

It is similar in appearance to conventional ball-type mandrels. It's in the method of attaching spheres to shank that the new mandrel differs. Normally, the spheres are attached with links which allow the device to swivel in one direction.

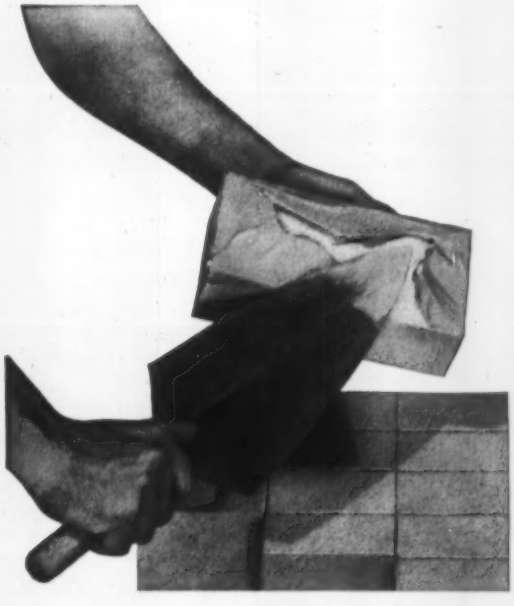
Cable Connected — In Temco's mandrel, spheres and shank are strung on a length of 3/16-in. cable. An AN-666-6 RH shank-type terminal is swaged on one end of the cable, and a ball terminal is swaged on the other end. The mandrel can swivel in any direction; setup time is cut 15 per cent.

Fabrication is simplified by the cable attachment. It takes the place of links that must be machined. Temco has built four mandrels at a cost of about $200 each. Conventional ball-type mandrels cost $700 to $800 each.

BALL-TYPE MANDRELS
. . . for forming tight radius bends

The new tool can be adapted quickly for bends of large or small radius. The tighter the radius, the more balls are needed. Temco is using the mandrel to bend 2, 2½ and 3-in. OD tubing.

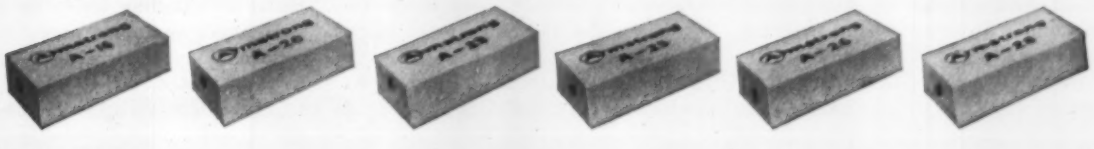
Dust Free... clean surfaces of Armstrong Insulating Fire Brick provide good base for mortar

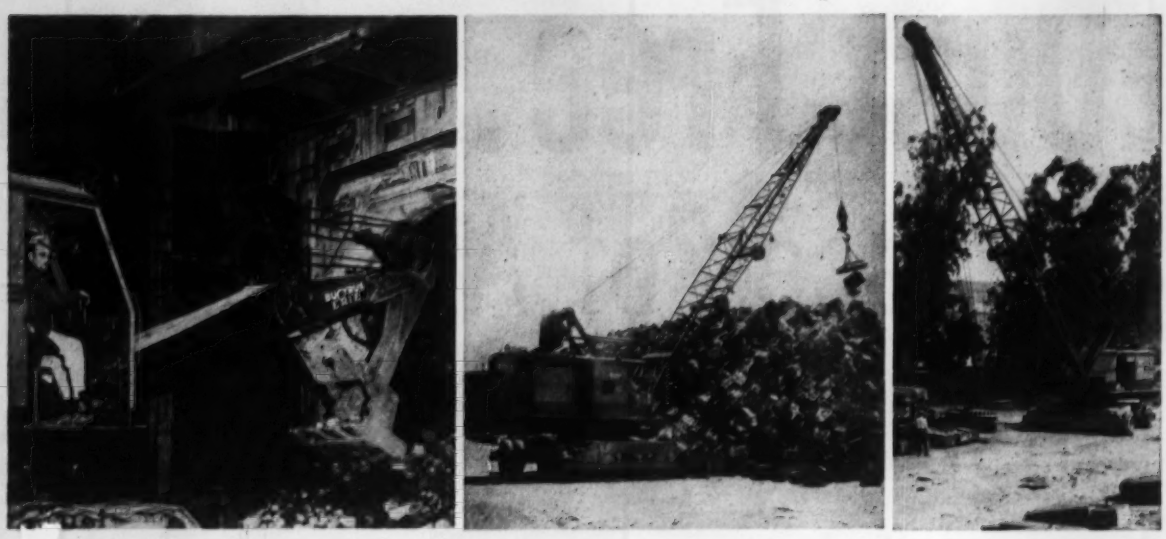


The unusually high strength and uniform texture of Armstrong Insulating Fire Brick prevent excessive dusting when brick surfaces rub together during transportation or handling. The dust-free surfaces allow good mortar penetration and well-bonded wall constructions.

Get the free booklet giving complete details on the entire line of Armstrong Insulating Refractories. Write Armstrong Cork Company, 2709 Reed Ave., Lancaster, Penna. For help in planning your next furnace lining or building job, call your Armstrong engineer.

Armstrong INSULATING REFRACTORIES





Kaiser economizes on these jobs when . . .

Construction Machines Move Into the Mill

A COUPLE of pieces of conventional construction machinery, used unconventionally at Kaiser Steel Corp.'s Fontana, Calif., plant, are chalking up some dramatic efficiency records.

For instance, a modified drag shovel cleans out open-hearth slag pockets in 3½-hours without the use of explosives. Out in the scrapyard, two, wheel-equipped cranes keep 1000 tons of scrap moving to the open hearths every day. Each handles 10-ton loads on 65-in. electromagnets.

Furnace Rebuilding — Slag pocket cleanout and furnace rebuiding take place after 175 heats. With Kaiser's nine open hearths, this means the job comes up once every nine days on the average. The object, of course, is to get the furnace back in production as soon as possible.

Kaiser's attempt at slag pocket cleanup with construction machinery nearly ended in failure. In two months time, a smaller drag shovel practically fell apart under the brutal pounding it took. A heavier handle and digging teeth sturdier than those used in construction were incorporated in a Bucyrus-Erie 38-B machine.

A 4½-ton handle, fabricated largely from solid high-strength steel, was made in the Kaiser shops. A rugged 4-tooth chopping hoe, heavily hard-faced with Stellite No. 6, was added to the handle, and the assembly rigged to the low gantry of the machine. Control cables were upped to ¾ and 1 in. in diameter.

Typical Operation — First, the machine moves in and rips out the front brick wall. That done, it gouges into the slag pocket as far as the pullout of waste material will allow. A string of rail cars then moves up to the pocket entrance and a model 105 Eimco rocker shovel loads out the broken material. Another pass made by the drag shovel breaks loose more slag which is raked outside to where the rocker shovel can go to work again.

The operator is so skilled and the machine so heavy and powerful that the cleanup job is done without damaging the arches or sand walls.

When a slag pocket cleanup is finished, the drag shovel moves outside the plant to a storage area. It can be called upon for any type heavy digging. In an emergency, the rugged digging assembly can be removed and the machine rerigged as a conventional shovel or crane.

Why Mobile Cranes? — Scrap handling, one of the important auxiliary parts of steelmaking, also has been adapted to construction-type equipment. The operation is more of a natural job for heavy-duty cranes. The Fontana yard covers a sizable area, and what was needed was some type mobile crane with good reach, capable of handling loads up to 20 tons under sustained operation.

Two Bucyrus-Erie 54-B cranes were mounted on 16-wheel Maxi trucks. Ordinarily, the 54-B is

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used as a 2½-cu yd dragline or shovel. This assignment marks one of the first times the 54-B has been on mobile, rubber-tired mounting. The Maxi units give a top speed of 5 mph in either forward or reverse, and they can take any sharp turn in the mill area.

Scrap Handling—Working with electromagnets 65-in. in diameter, the cranes unload the scrap, move it around the yard, transfer it to the overhead-type mill cranes and even handle finished steel ingots. Not long ago, one of these 54-B's was rigged with a 120-ft boom instead of its usual 60-ft stick. It went on temporary duty on a major overhaul job in the mill.

Steel comes to Fontana in many scrap forms. Old automobile bodies are pressed into bales and fed to the open hearths. Other scrap arrives in loose pieces and is easily handled in 10-ton loads. Sixteen 500-ton locomotives recently came into the yard under their own steam, were cut apart and the pieces carted away by the two cranes.

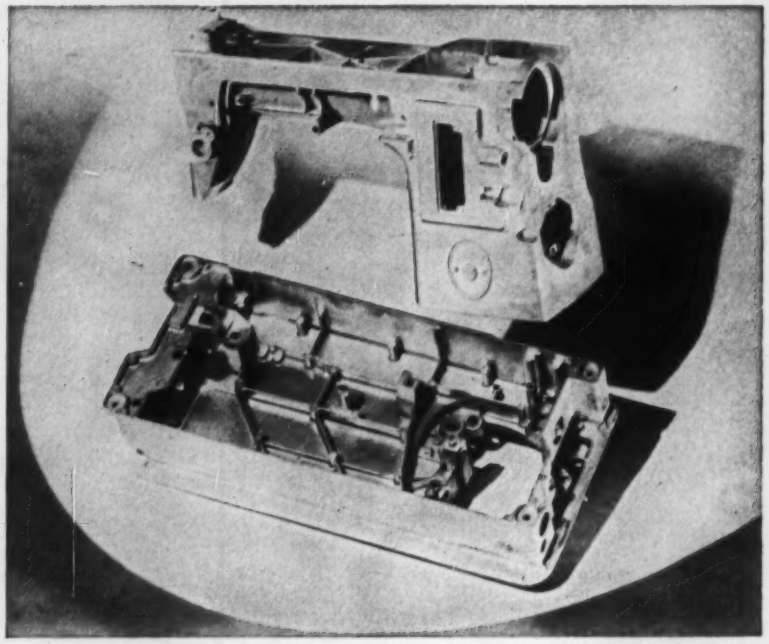
Some 75 railroad cars are unloaded each working day at Fontana. The two mobile cranes also find time to prepare about 1000 tons of scrap charge for the furnaces.

Carburizing Gets a Boost

A new radiant tube, pit-type gas carburizing furnace, installed at Pittsburgh Gear Co., Pittsburgh, Pa., can handle parts up to 6 ft in diameter, 6 ft long and 8500 lb. It can produce up to 25 tons of deep-case carburizing a month.

Production tests at the Brad Foote Gear Works subsidiary have shown excellent results in carburizing various shapes and sizes of gears, shafts and pinions. Test results have been particularly satisfactory in applications where gears requiring various case depths are loaded together.

The furnace provides accurate control of carbon penetration and carbon potential. An endothermic generator provides controlled atmosphere to which is added metered quantities of natural gas for furnace dew point control.



Singer's new model 301 machine has diecast aluminum frame and base

Diecastings Lighten Sewer's Load

AN OLD TIMER has gone modern. Singer Mfg. Co.'s model 301 sewing machine has taken on a new look because of aluminum diecastings.

Once a heavy, traditional-looking machine, it now is a lightweight, clean-line unit that can be used interchangeably as a portable or cabinet machine.

Before — Until the new model was produced, the main frame and housing of all Singer machines were assembled from two iron sand castings—a base and a casting which formed the machine's head, horizontal arm and vertical support.

Before these sand castings could be assembled, extensive machining was required for surface finishing.

Now—The new 301 weighs less than half that of its cast iron predecessors. Two large diecastings form the basic machine—an intricate, thin-walled base and a more complex, upper frame.

Here's how diecasting helps. You can mass produce close tolerance, intricately cored, smooth surfaced, precision components. At Singer it eliminated previous machining operations, produced the streamlined design and provided a good surface for the machine's japanned finish (biege or black).

Inside—All working parts are inside the diecastings. A hinged end cover encloses head end cavities that guide the slant needle and permits direct oiling of the surfaces. The old oil hole is gone.

The motor housing seat is cast-in to provide a precise internal location for the motor. Three other diecastings—an extension plate on the bed, a top cover and a lamp shade—complete the 301's housing assembly.

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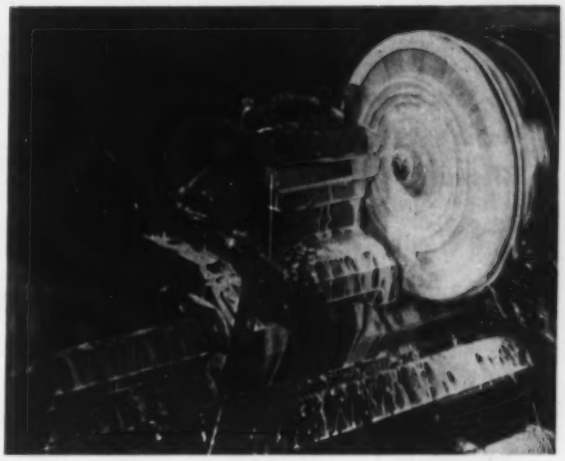


Inconel and Stellite are hard on tools but . . .

Carbide Tames Tough Alloys

USING the right grade carbide to machine aircraft turbine wheel buckets paid unexpected dividends at Kelsey-Hayes Wheel Co., Jackson, Mich.

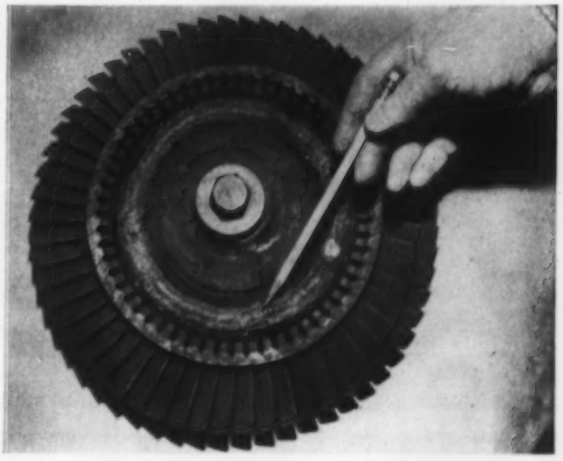
It compressed a two-cut operation into one, reduced the number of tools required each day from 60 to 20 and upped daily production from 25 to 48 units.

The Job—The turbine assembly is 12 in. in diameter, 8½-in. of which is the wheel—Inconel, heat treated to Rc 18. The balance of the assembly is a rim of Stellite buckets welded to the wheel.

Machining is complicated by the toughness of Inconel and the rough, irregular weld which imposes the stresses of an interrupted facing cut. Also, the facing cut at the outer wheel edge runs into the Stellite bucket rim, making the tool cut two different types of metal at the same time, and under the same conditions.

The job now is run at 56 rpm on a 7½-hp, Warner & Swasey engine lathe. The Carboloy grade 370 carbide tools take a ⅜-in. depth of cut at a feed of 0.0155 in. per revolution.

Roughness of weld adds to machining difficulties



BEFORE		AFTER	
16-gage copper blanks, 27½-in. in diam	$ 5.28	0.081-in. aluminum blanks, 27½-in. in diam	$1.65
Labor and overhead for spinning reflector	5.35	Labor and overhead for spinning reflector	2.45
Electroplating	4.00	Cost of enamel and vacuum plating	0.95
Cost of reflector, each	$14.63	Cost of reflector, each	$5.05

Vacuum Brightens Metal Picture

COST FIGURES above show what happened at Elwood Pattern Works when the switch was made to vacuum metallizing on its photographic enlarger reflectors.

Elwood's president, E. C. Rogers, says he will make added savings before long by changing to a 5/16-in., hot-rolled steel reflector fabricated by automatic spinning. Vacuum plating will give the bright finish needed here, too.

Start — After reflectors are formed, they are given a coat of clear enamel, baked to a hard finish. This leaves a smooth, slick surface on the metal without polishing. Since the vacuum deposit of aluminum reproduces exactly the surface on which it is plated, the metal coating is bright and highly reflective.

The enamel coating does an important job as a top coat, too. It's applied and baked on after the reflectors are metallized to protect the plate of 5 millionths of an inch of bright aluminum.

Many Products — Developments in more durable synthetic resins and lacquers are opening up some of the brightest prospects in the whole vacuum plating field.

The organic film forms both the base and top coat for the vacuum film on items such as zinc-base diecastings, hardware, appliance parts and plumbing fixtures.

It gives a smooth finish on the base metal without expensive polishing. Without the protective top coat, the thin vacuum deposit wouldn't stand a chance with abrasion and corrosion in many applications.

The enamel top coat can be dyed to give bright reflective finishes of almost any color or simulate gold or copper.

What You Need—The basic unit for vacuum coating is a horizontal or vertical steel chamber. The horizontal unit like the one used at Elwood seems to be preferred because it's easier to load and unload. It was built by National Research Corp., Cambridge, Mass.

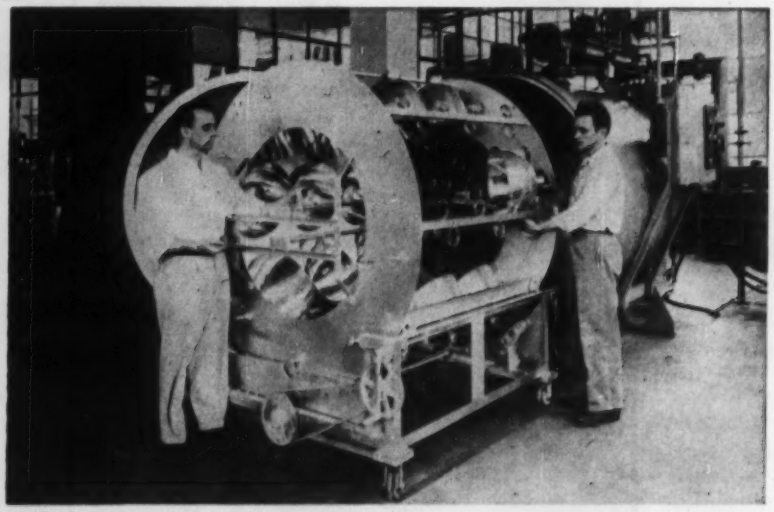
Parts are mounted on racks and placed within the chamber. At Elwood, 21 reflectors are coated at one time.

The door is closed, and the vacuum pumping cycle started. The pumping system: One 16-in. diffusion pump backed up by one 202-cfm two-stage rotary gas ballast pump and one 3.83-cfm rotary gas ballast pump. Air-operated valves are used.

Heat's On—When a vacuum of about 0.5 micron is reached, the aluminum wire (small staples) is heated to incandescence by resistance on a tungsten filament. The metal evaporates and condenses on the surface of parts exposed within the chamber.

The plating vapors travel only in a straight line. This means it's necessary to rotate parts within the coating chamber to be sure all areas are covered.

Coating takes from 30 seconds to 1 minute. The remainder of



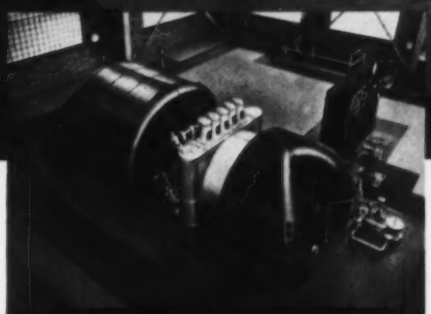
Reflectors are racked, 21 at a time, for vacuum coating with aluminum

fourteen I-R Turbo-Blowers

serve the Ecorse plant of

GREAT LAKES STEEL

Above (left) is latest I-R 125,000 cfm, 35 psig, 15,750 hp blower for Blast Furnace A. At right is 60,000 cfm, 30 psig, 7,000 hp unit installed in 1936.



This 125,000 cfm I-R Turbo-Blower serves D furnace on a round-the-clock basis with no standby source of "wind."

Four I-R 27,000 cfm, 6 psig, 1,000 hp Coke Oven Gas Boosters, with Adjustable Inlet Guide Vanes and Power Wheel for efficient part load operation.

IN THE huge, modern plant of the Great Lakes Steel Corporation, Detroit, Mich., division of National Steel Corporation, fourteen I-R Turbo-Blowers with a combined capacity of more than 650,000 cfm serve the blast furnaces, converters and coke ovens.

These fourteen units include:

2	125,000 cfm	35 psig	Blast Furnace Blowers
1	60,000 cfm	30 psig	Blast Furnace Blower
4	45,000 cfm	30 psig	Bessemer Converter Blowers
4	27,000 cfm	6 psig	Coke Oven Gas Boosters
3	19,800 cfm	4¼ psig	Coke Oven Gas Exhausters

The blast furnace blowers are all turbine-driven and served by I-R surface condensers and auxiliaries. And all of the Converter Blowers and Gas Boosters are provided with I-R power-saving Adjustable Guide Vanes and Power Wheel assemblies.

Here at Great Lakes Steel, *confidence* in Ingersoll-Rand blowers is based on 19 years of on-the-job performance in continuous, heavy-duty service.

12-230

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO-BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

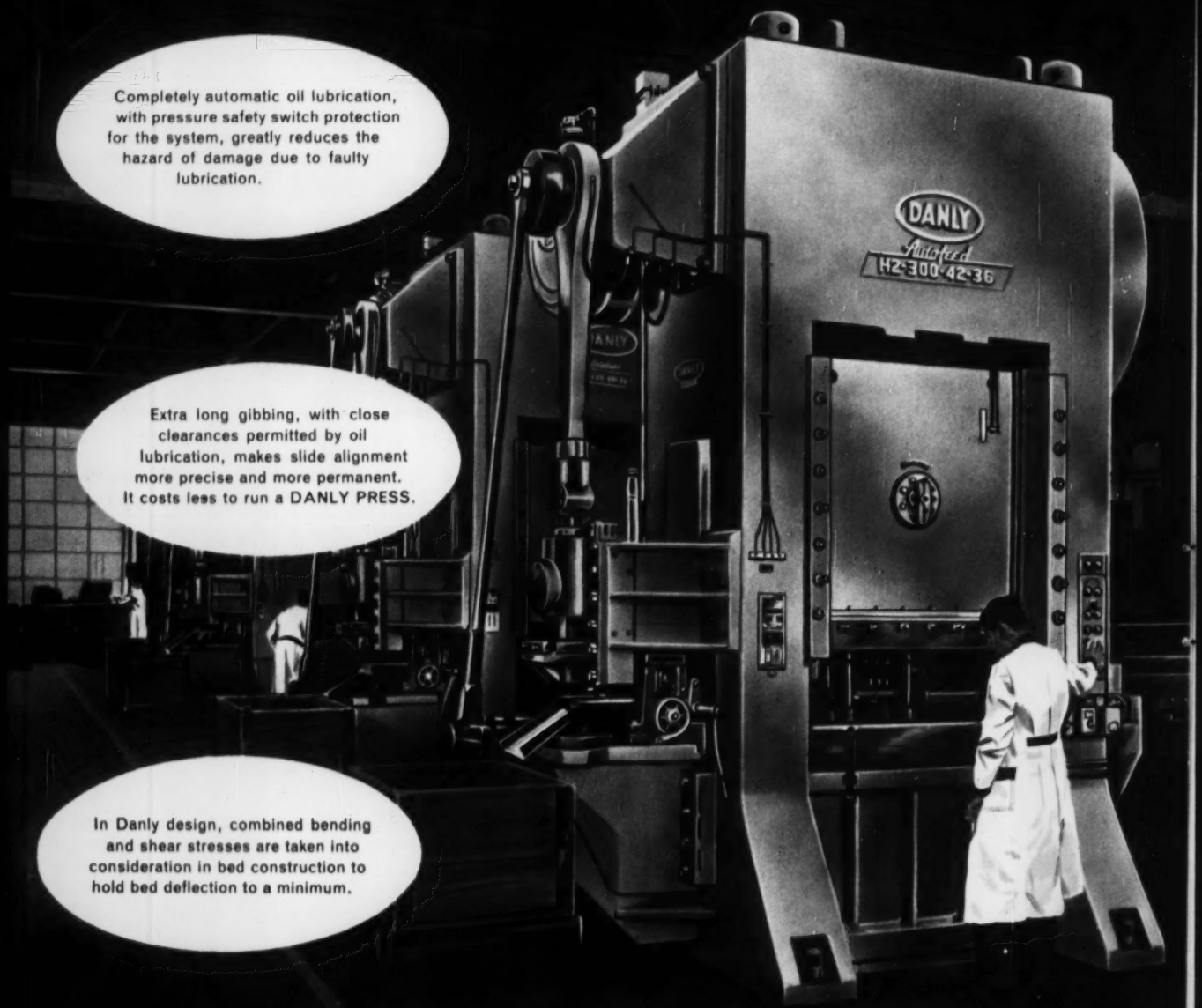
comparison proves

DANLY AUTOFEED PRESSES MAKE HIGH PRODUCTION DIES LAST LONGER

Completely automatic oil lubrication, with pressure safety switch protection for the system, greatly reduces the hazard of damage due to faulty lubrication.

Extra long gibbing, with close clearances permitted by oil lubrication, makes slide alignment more precise and more permanent. It costs less to run a DANLY PRESS.

In Danly design, combined bending and shear stresses are taken into consideration in bed construction to hold bed deflection to a minimum.



USE THIS CHECK LIST

...Compare Danly Presses, feature for feature, with any other press on the market.

COMPARE	FEATURE	DANLY	OTHER
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Faster installation is assured by assembly and operation in the Danly plant.	✓	
DRIVE	Danly's cool-running clutch lasts up to 7 times longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓	
CONSTRUCTION	Danly presses are made entirely of heavy stress-relieved steel weldments. Extra heavy internal ribbing decreases deflection.	✓	
LUBRICATION	Danly features completely automatic oil lubrication. When any vital area is not being sufficiently lubricated, safety switch stops press.	✓	
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓	
CONTROLS	Special Danly Control arrangements make operation easier and safer, minimize accidental damage, facilitate automation—can be completely enclosed.	✓	

. . . that's the report received from one of the world's leading manufacturers of conveyor systems and materials handling equipment. Their comparison of Danly press features against all others, led them to install Danly Autofeed Presses in critical production lines.

Today, after more than six years of high speed production, these Danly presses have required *no major maintenance*. Set-up men prefer the Danlys too, for their *accuracy* of *slide alignment*. Die-setting is easier and faster. Precision dies are better protected against wear, last longer because *vibration and deflection are greatly reduced*. Exacting piece part tolerances of plus or minus .001 are maintained through continuous production runs. This is in spite of the heavy tonnage requirements of off-center coining, piercing and blanking through three stage dies.

Danly presses can provide you with the same amazing economy and dependability of operation. Use the check list in this advertisement . . . make your own point-by-point comparison and see why Danly presses will give increased production at lower cost.

It costs less to run a DANLY PRESS

DANLY MACHINE SPECIALTIES, INC.
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VANADIUM CORPORATION OF AMERICA

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VANCORAM BRAND

Producers of alloys, metals and chemicals

Two Vancoram Manganese Products for Superior Steel and Iron:

Silicomanganese Alloys
Ferromanganese Briquettes

These two versatile Manganese alloys, members of the Vancoram family of products, were each carefully developed to help steel and iron makers produce metals of the highest quality with maximum efficiency.

VANCORAM SILICOMANGANESE ALLOYS, available in three grades, are valuable additions to both steel and cast iron . . . serving as a furnace block, deoxidizer, desulphurizer and source of manganese. These alloys are noted for their purity and uniformity of composition.

Carbon	Manganese	Silicon
1.50% max	65/68%	18/20%
2.00% max	65/68%	15/17.5%
3.00% max	65/68%	12/14.5%

VANCORAM FERROMANGANESE BRIQUETTES are recommended for use in iron as a manganese addition agent and also as a desulphurizer. Their shape is oblong for swift identification, their weight is approximately 3 pounds per briquette for easy handling, and their manganese content is exactly 2 pounds for simple addition without weighing.

The Briquettes are furnished in convenient palletized form, if required, thus simplifying handling and storage and reducing contamination.

Whether you make your additions to furnace, cupola or ladle . . . you'll consistently get better, more uniform results when you use Vancoram Silicomanganese Alloys or Vancoram Ferromanganese Briquettes.

the cycle is taken up by loading, pumping down, air releasing and unloading. Production at Elwood could be increased by putting in higher capacity vacuum pumps, keeping the same size coater.

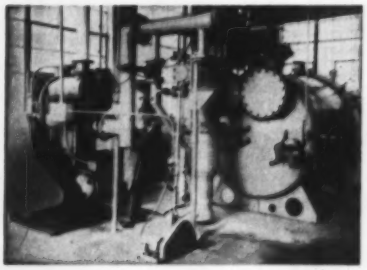
Factors—Pump down time is affected by factors besides size of the system and pumping capacity, including number, size and composition of parts being coated, atmospheric and tank conditions.

With each cycle, aluminum vapors condense not only on the material being coated but also on tank walls and other surfaces inside the tank. It builds up to form a sponge-like surface that turns into a trap for air, dirt, moisture, etc.

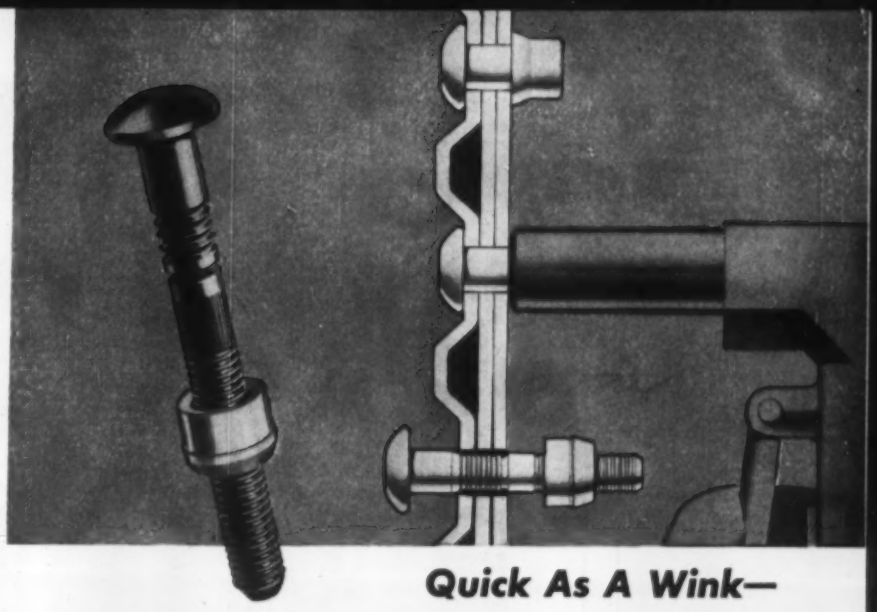
The heavier this coat, the harder it is to outgas the tank and the longer the pumpdown time. Clean-out used to be a tough problem. Elwood takes advantage of NRC's "Narliner." It's a liquid that forms a heavy strippable film inside the vacuum chamber. When clean out time comes, it's easy to peel it off and the condensed aluminum comes with it.

Lacquer Here, Too—To get a vacuum in the coating range (less one 1 millionth of atmospheric pressure), it is necessary to remove the gases attached to or contained in the parts being coated.

Total surface has an effect on the time it takes to remove gases. Irregular surfaces tend to trap gases and delay the outgassing process. Materials, such as wood, leather and cellulose acetate, have constituents whose pressures are higher than the coating pressure. Two solutions to this problem: A mammoth pumping system or more practical a lacquer coat to seal in the gases.



Pumping system uses one 16-in. NRC diffusion pump backed up by a two-stage rotary gas ballast pump and a rotary gas ballast holding pump



Quick As A Wink— You Get Secure, Permanent Fastening With Townsend Lockbolts

In less than a second, with one squeeze of the trigger, a Townsend lockbolt pulls the work together with a high clinching action, is locked in place with uniform pressure. It is a quick method of producing tight, rigid, permanent fastenings that cannot loosen even under extreme vibration or shock conditions.

Townsend lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. Installation is fast—under certain conditions, one man will install 30 in only 60 seconds. Fewer workers will complete an assembly in less time than when riveting or bolting.

The clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The lockbolt fills the hole better than other fasteners, thus making possible a more rigid joint and also providing an effective liquid seal.

The Townsend lockbolt consists of two precision-made parts—a pin and a collar. Locking grooves are provided on the pin into which the collar is swaged by the pneumatic gun. The pulling section of the pin breaks in tension at a predetermined point when the setting action is completed.

Townsend lockbolts are available in steel and aluminum alloy, in 3/16", 1/4", 5/16" and 3/8" diameters, in grip lengths ranging up to 2", in various head styles. For information on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts, use the coupon below.

Licensed under Huck patent nos. RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049.

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Abrasive Belt Polishing

By LEE VORCE
Regional Product Engineer
Behr-Manning Division, Norton Co.
Detroit

Ten-station rotary line polishes aluminum appliance trim. Rear stations are for buffing

THE FIRST considerations in setting up an abrasive belt grinding line are the part shape, material, finish and production required.

Shape of the part often dictates belt type, its width and the type of contact wheel. It also controls fixturing and the selection of work transport methods.

Flat surfaces of limited dimension, for example, call for platen-head techniques. However, much has been accomplished on flat parts (shower drain grilles, skate blades, etc.) with horizontal conveyor belts carrying the parts under contact drums around which wide belts run.

Curves — Cylindrical or oval work calls for rotating spindles on which work-holding fixtures are mounted. Here either semiautomatic or rotary-table machinery is more adaptable than straight or horizontal-return lines.

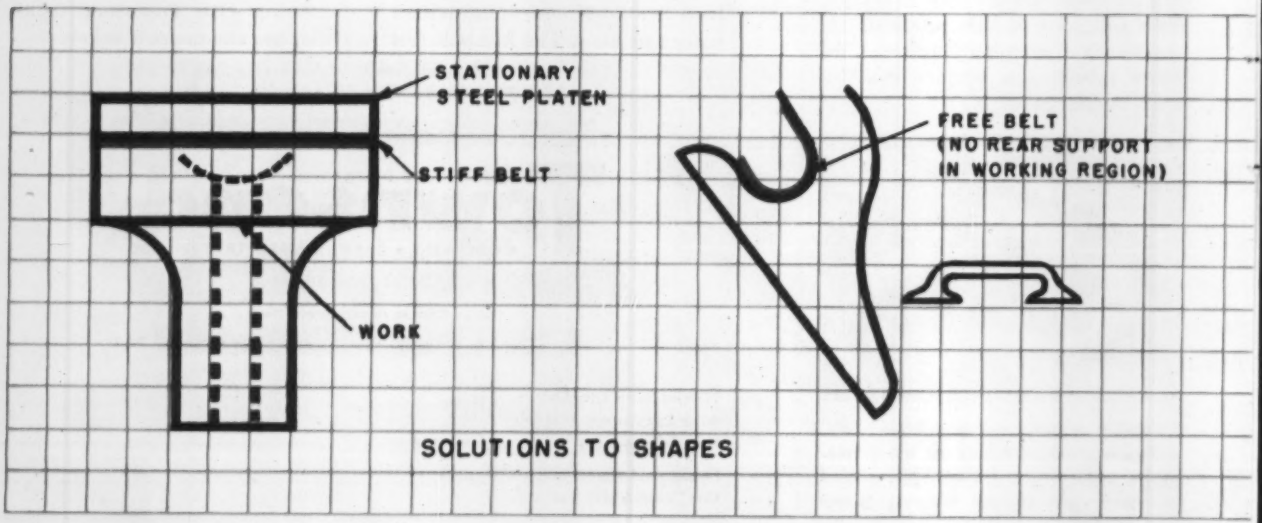
Work with compound curvature (concave or convex) can be handled with flexible J-weight belts and soft contact wheels which accommodate convexities and concavities. Unless the concavity or convexity is small, compound curvature usually requires that the polishing be done in several swipes at sequential stations rather than in one dwell at one station.

If internal surfaces or recesses are to be polished, you must consider heads with small contact wheels—like the yoke-sanders—or many of the portable abrasive-belt tools used as heads in an automated setup.

An important tip is that an end radius, curving up from flat or near-flat surface, can be polished in the same swipe as the flat itself. The belt must track so it overhangs a soft contact wheel by as much as ⅛ to ¼-in. on the side where the radius occurs.

Strapping techniques often are useful where the belt is to polish a curved surface by accommodating to the natural arc of the piece itself.

Versatile — A new wearable wheel, such as our Kon-Toor, requires no belt at all. It's composed of folded coated abrasive cloth and is useful in automatic machinery for the fine polishing of curved surfaces. This wheel is not sufficiently aggressive for stock removal or roughing work.



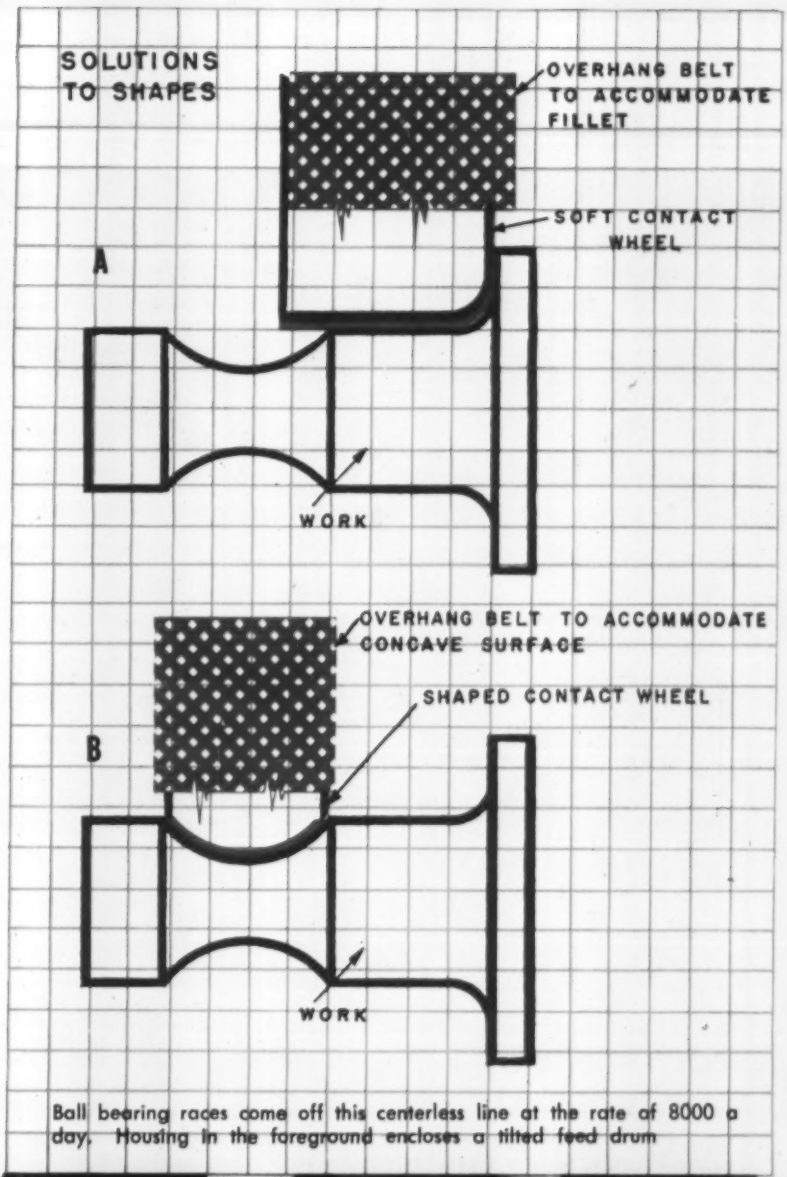
Design Ideas—The required production rate is a commanding consideration. Often high production is accomplished by planning more stations than are necessary. This reduces dwell time at any one station. Dwell time is the determinant of line productivity.

If each workpiece dwells 10 seconds at each of nine stations, rather than 30 seconds at each of three, a line will produce six parts per minute rather than two. Time of travel between stations should, of course, be added to the dwell time at each station, to establish the precise per-piece productivity rate.

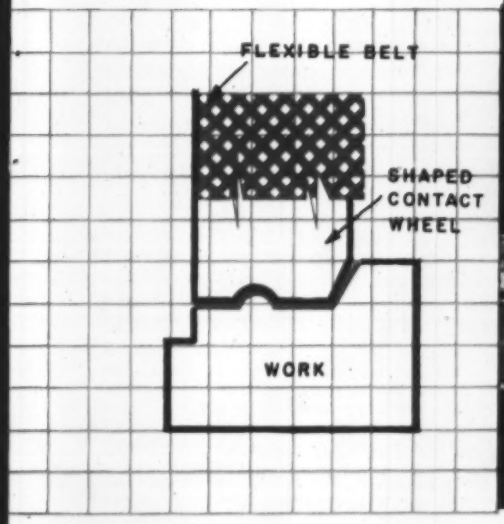
Another reason for adding stations is to permit belt change without loss of production time. Inactive station No. 9, for example, may be thrown into service when it's time to replace the belt at station No. 8.

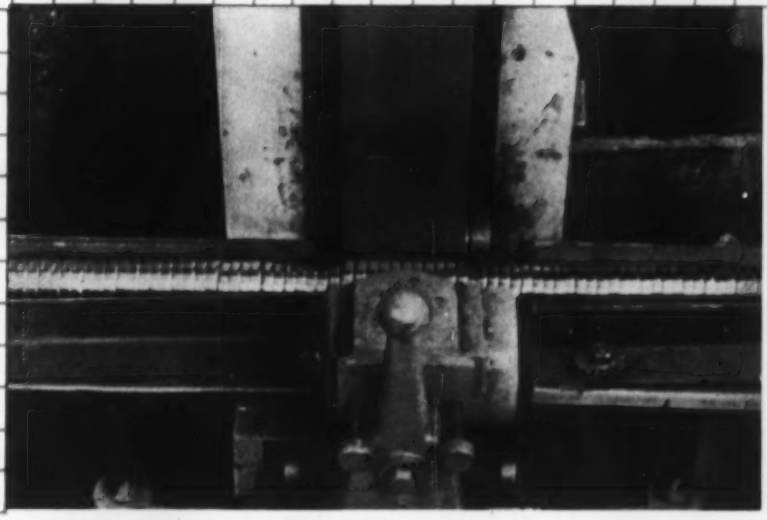
Fixtures—Forces that act upon a workpiece have to be absorbed by the fixture. The problem is not difficult with block or rotating fixtures. But with parts merely laid on a conveyor belt and passed under a high-speed contact wheel or drum, special procedures for holding the part while being polished may be required.

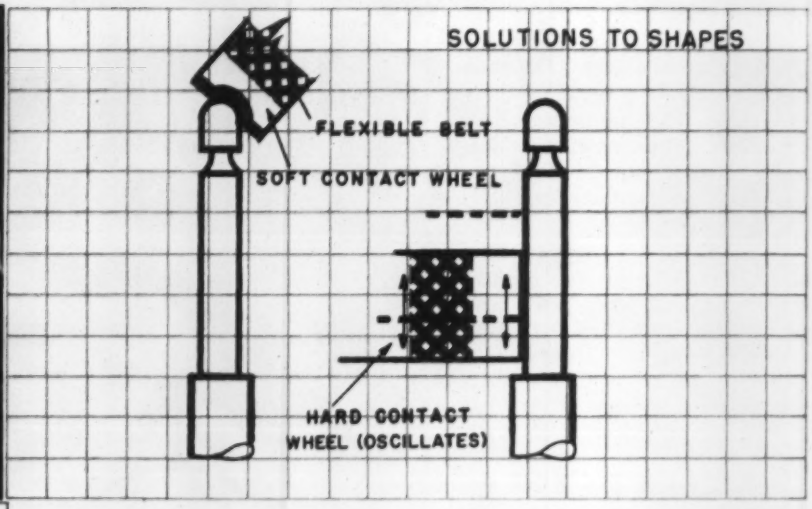
One method is to provide a magnetic chuck under the belt. Another technique is to provide the belt with cleats thinner than the workpiece, and arrange loading so that parts are placed in contact with this cleat before they pass under the wheel or drum. Another

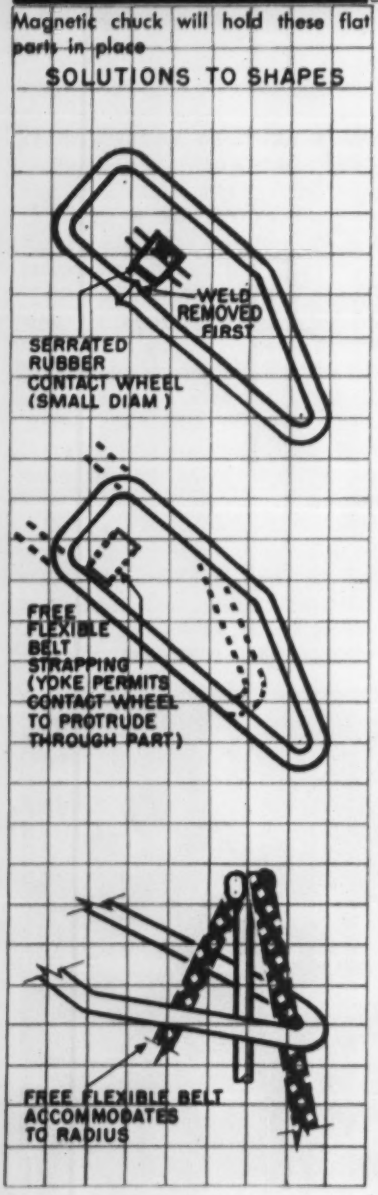


Ball bearing races come off this centerless line at the rate of 8000 a day. Housing in the foreground encloses a tilted feed drum








Magnetic chuck will hold these flat parts in place
SOLUTIONS TO SHAPES
WELD REMOVED FIRST
SERRATED RUBBER CONTACT WHEEL (SMALL DIAM.)
FREE FLEXIBLE BELT STRAPPING (YOKE PERMITS CONTACT WHEEL TO PROTRUDE THROUGH PART)
FREE FLEXIBLE BELT ACCOMMODATES TO RADIUS

method is to use conveyor belts that won't let parts slip under treatment—soft rubber, grooved rubber and even rubber cut in the direction of travel.

Belt Changes—Most critical polishing jobs require a sequence of grits so successive stations perform progressively finer polishing jobs until the job is either finished or a buffing station is introduced. Lower operating costs often can be accomplished by moving a belt forward to another station after a known number of hours of service at a relatively rough polishing station.

The belt always is moved to a finer polishing station rather than discarding it. After a 120-grit belt, for example, has operated for most of its full life cycle at its designed task, it is worn down to the point where it behaves as, say, a new 240-grit belt.

Wet or Dry?—The design of a line-and-station installation also is greatly affected by whether the polishing job is wet or dry. Water lubrication of a head requires housings, drains and special construction of the mechanisms which operate in that area or pass through it.

If testing shows that simple dry lubrication with a light grease is feasible, your line-and-station polishing setup will be much simpler in design, construction, maintenance and accessibility.

Belt-Power — The friction between a traveling abrasive belt and a workpiece may be used to manipulate or rotate the workpiece during processing. Since you usually want the part to rotate in the direction of belt travel, rotation at each polishing station can be accomplished by merely braking the rotating fixture rather than having to drive it. Also, an auxiliary belt (either rubber or coated abrasive) can be used as the rotating device.

In centerless grinding long workpieces it is common to use a second abrasive belt tilted at an angle of a few degrees (adjustable) to the grinding belt. The part can be moved at a controlled rate while it is being finished from end to end. This technique also works for a solid stream of parts, such as ball bearing races or short pins, which can push one another along.

Don't neglect the efficiency of the human element at any station. More often than not, loading, unloading and inspection are incorporated, with skilled operators using precision gages and inspection equipment. Often, simple hand manipulation at one point in the line can so greatly simplify the design of the whole line that economics and practicability are greatly enhanced. Man is still the most infinitely flexible fixture designed.

This is the final article in a series on abrasive belt polishing by Mr. Vorce. The other two appeared in STEEL, *on Sept. 5, p. 86; and Sept. 12, p. 102.*

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *Penton Bldg., Cleveland 13, O.*

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J&L's JALTEN series offers you three top performing high strength, low alloy steels with the following characteristics:

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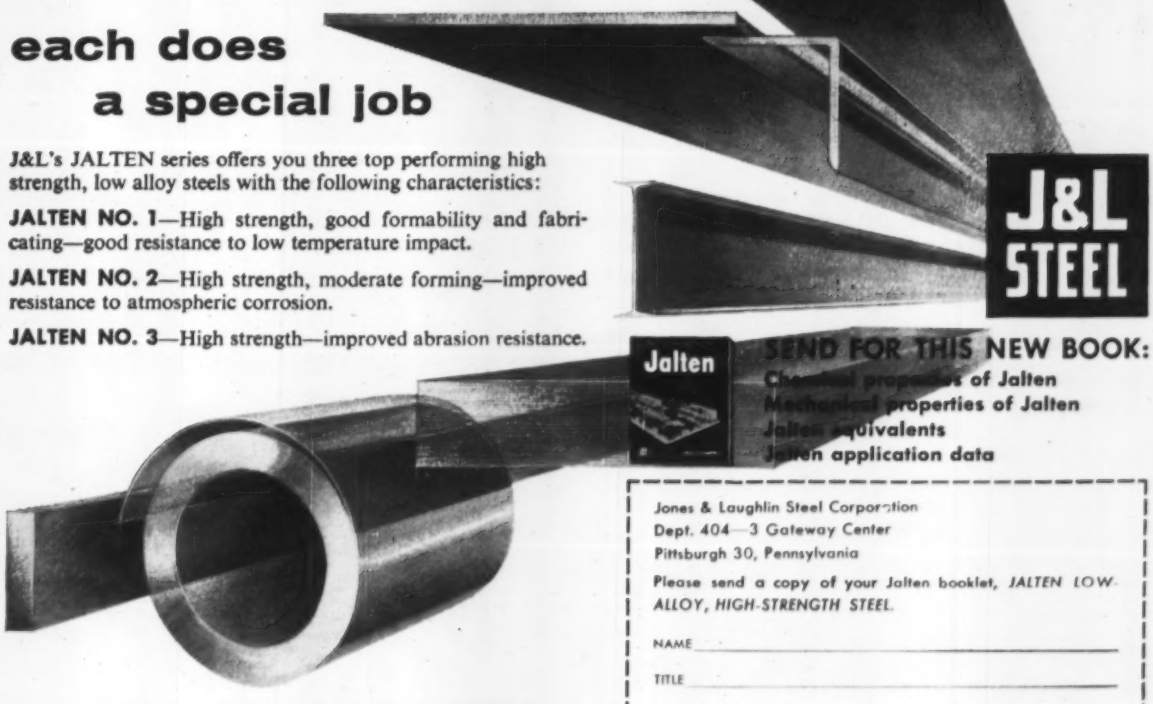

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Chemical properties of Jalten
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EVOLUTION OF MULT-AU-MATIC PROGRESS

Since 1914 the Bullard Mult-Au-Matic has reflected engineering and design progress required to fulfill industry's needs — until today, the Type "L", is the optimum for machines of its type.

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CONTROL SYSTEM

Advanced design of electro-hydraulic controls provide a readily accessible and simple control system for both Set-Up and Automatic machine operation.

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Completely new screw type feed works insures smooth constant rate of advance of tool slides through any desired part of a 16" stroke with 81 feed changes ranging from .0025 to .0625.

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The new indexing mechanism with improved carrier column bearing permits faster index of spindle carrier thereby reducing time between cuts. New design index mechanism registers and locks carrier, on successive indexes, to within ±.0005.

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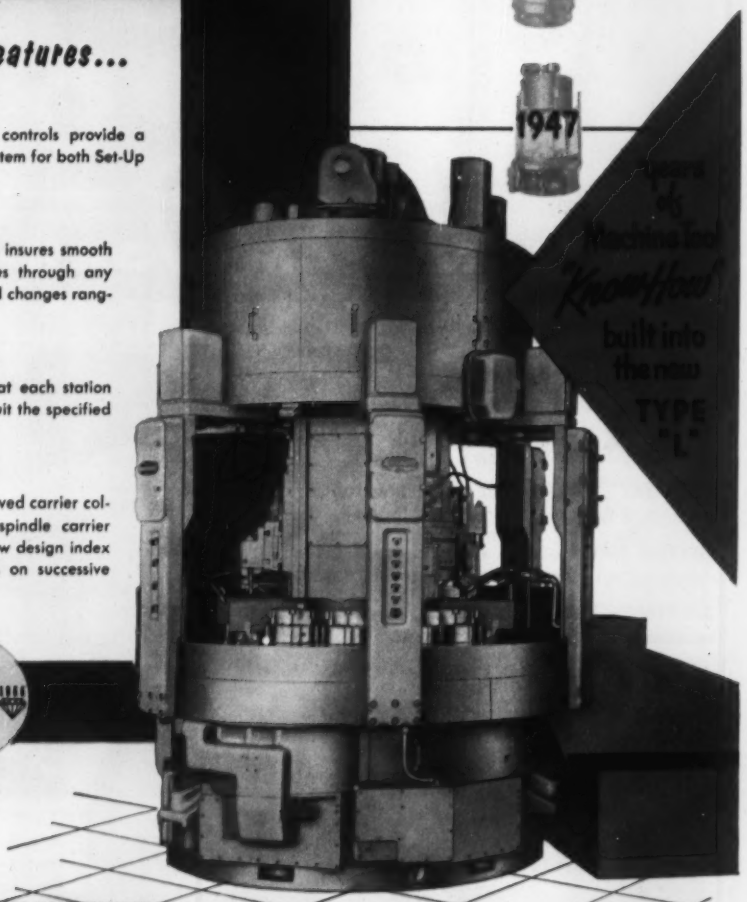
years of Machine tool *Knowhow* built into the new TYPE "L"



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MULT-AU-MATIC TYPE "L"
Available in three sizes
10" with 6, 8, 12 or 16 spindles, 14" and 18" with 6 or 8 spindles.

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

Electric Heating Element Prevents Voltage Leaks

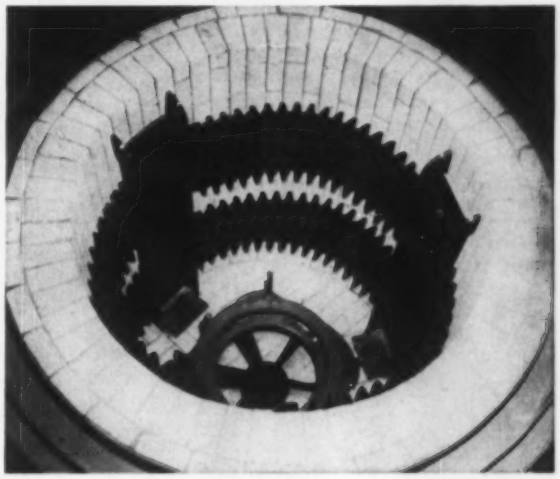
These heating elements for heat treating furnaces (they are corrugated sheets of nickel chromium) assure operator safety. Voltage is so low that accidental contact with them cannot be felt.

Large sheets of the material are hung from alloy hooks that extend through the roof. Installation and replacement are simple.

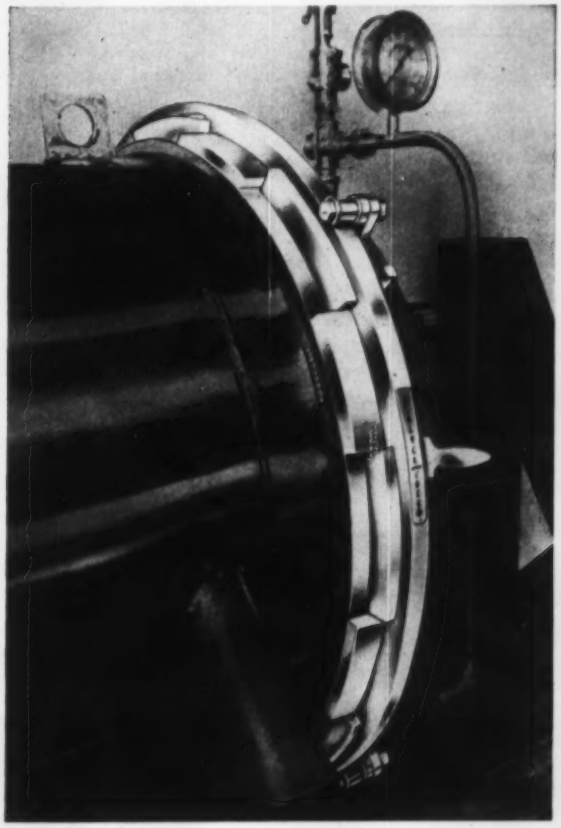
Longer element life and lower temperatures result from the large surface area. Amperages are 10 to 20 times greater than those in elements previously used.

An oxide coating is sufficient to confine the current to the element even when covered with soot. In addition, a high temperature enamel is fired on the elements.

New transformers that provide low voltages have been developed for the new heating method. *Write*: Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 17, Ill. *Phone*: Monroe 6-3443



Cover Lock for Pressure Vessels Is Fast Operating



This easy-to-operate safety cover is particularly useful for pressure vessels that require frequent opening. It was developed for vertical and horizontal plate filters, but it's equally adaptable for manhole covers and pressure vessels like autoclaves that require a safe closure.

The cover is locked by a series of bow-shaped lugs mounted on a third ring. The lugs are in direct rectangular shear. If one lug fails, the cover won't open because the stress divides equally among the remaining lugs. A high safety factor prevents remaining lugs from being overstressed.

An O-ring sealing gasket is used. This gives a self-seal that becomes tighter in direct proportion to the increase in internal pressure.

High tensile strength steels are used in the all-fabricated and forged construction.

The third ring has a locking arrangement that locks in both the open and closed position; engaging all holding devices is simultaneous and foolproof.

The ring floats in roller bearings and its lugs are not under shear until internal pressure in the tank is built up.

Even in a large diameter tank, the ring travels through an arc of only 15 to 20 degrees.

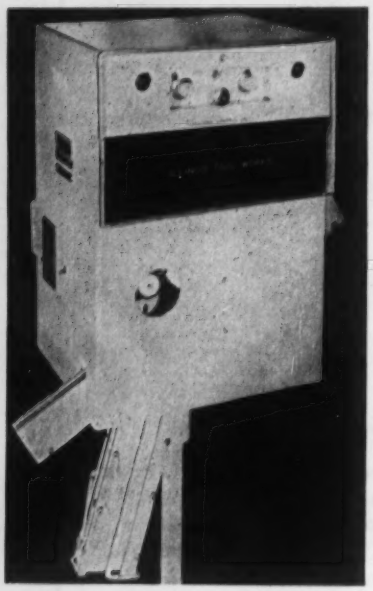
This means that the cover can be opened in seconds without the use of hand tools or power devices.

All surfaces of the closure are exposed and all the lugs are visible at all times; the unit meets all the ASME code requirements. *Write*: Sparkler Mfg. Co., Mundelein, Ill. *Phone*: Ambassador 2-3100

NEW PRODUCTS and equipment

Gear Inspector

Here is a unit that automatically controls gear size. Used with hobbing, shaping or shaving machines, it rejects gears that are under or oversize. It has an integral, continuously operating computer that shuts off production when the percentage of rejects reaches a predetermined level or after a certain number of consecutive rejections.



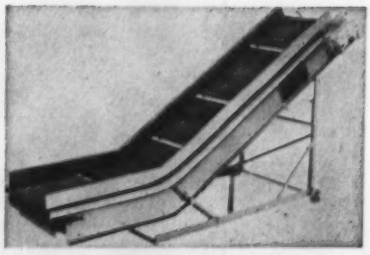
Gears up to 3 in. in diameter in various pitches and face widths can be checked. Rejected gears go into one chute; passed gears go into another. Tolerances can be set to 0.0001 in.

Computation is continuous. Each time a good gear is passed, the continuous reject counter returns to zero. With each gear, passed or rejected, the percentage is recomputed. *Write*: Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. *Phone*: Capitol 7-2200

Conveyors

Whether the product is hot, cold, heavy, sharp or awkward, this new line of conveyors will handle it. These bent models have steel-wire mesh belts that feature practically maintenance-free operation.

The low end of the conveyor can be adjusted from 8 to 20 in. off the floor. The height of the upper end ranges from 32 to 72 in., depending



on the length of the conveyor. The incline is 30 degrees. Conveyor lengths are 60, 90 and 120 in. *Write*: Campbell Machines Co., 18634 Fitzpatrick, Detroit 27, Mich.

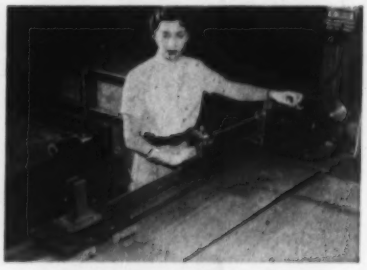
Free-Machining Steel

Here are two new steel bars. One offers high strength without heat treatment; the other, which has been severely cold worked and furnace treated, offers wearability without case hardening, excellent machinability, minimum warpage and strength without heat treating. *Write*: LaSalle Steel Co., Chicago, Ill. *Phone*: Regent 4-7800

Wire Twisting

Here is a machine that saves two-thirds of the time taken by hand methods. With a few minor adjustments, it can twist doubles, triples or more.

Work cycle: The operator secures one end of the wires to a rotation head. Geared to the head is a large dial calibrated in feet. It is set for the exact length to be twisted.



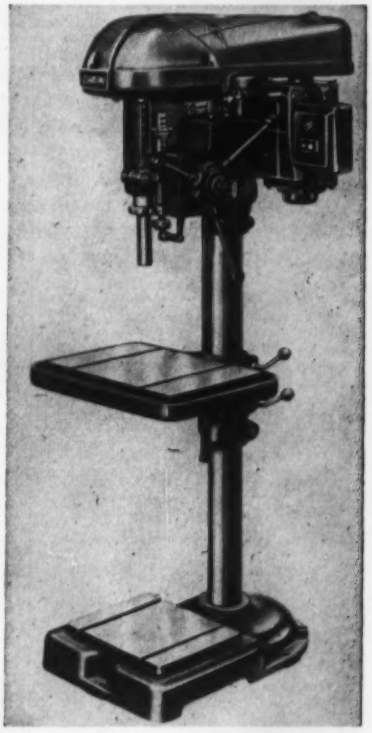
A tension device, locked to the track at the desired length, holds the wires in swivels which remove the individual spin in each wire as it is twisted.

The swivel plate is supported by a long rod. The rod has a variable friction drag which automatically compensates for the shortening as the wires twists. It prevents any stretching of the wire.

The operator presses a switch and a four-wheeled trolley with a wire guide travels along a 30-ft steel track. The twisting action provides the power. The ratio of turns per foot is fixed. *Write*: Ford Instrument Co., Division of Sperry Rand Corp., 31-10 Thompson Ave., Long Island City 1, N. Y. *Phone*: Stillwell 4-9000

Heavy-Duty Drill

This machine drills 1 in. in cast iron, ¾-in. in steel. It has a No. 3 MT spindle, 6½-in. spindle travel; built-in switch; honed bearings for quill; ball-bearing equipped



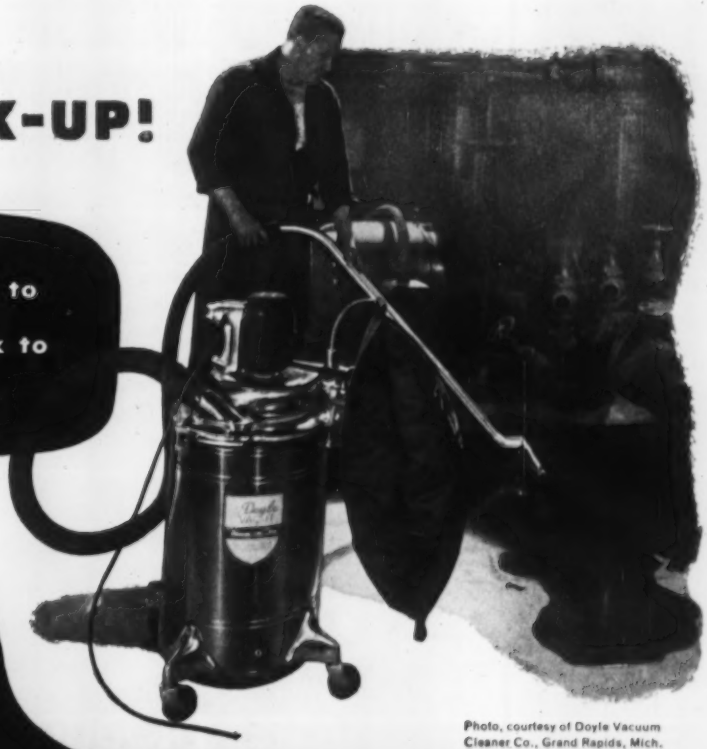
spindle; hand feed or gear-driven power feed. *Write*: Clausing Division, Atlas Press Co., Kalamazoo, Mich. *Phone*: 5-7157

Drilling Attachment

Drilling time required by hand screw machines and turret lathes is reduced by this unit. Drill breakage is reduced. The increased drill speed (machine, plus attach-

TERRIFIC PICK-UP!

For Speedy Solutions to Problems Like This, Look to the House of Stainless



Photo, courtesy of Doyle Vacuum Cleaner Co., Grand Rapids, Mich.

THE PROBLEM—When used in the recovery of certain corrosive liquids and materials, the tank of this DOYLE Vac-It industrial vacuum cleaner had to have high corrosion resistance as well as strong and durable characteristics. In these cases, painted or treated carbon steel could not withstand rust nor give the long service life desired.

THE SOLUTION—Looking forward to such a need, DOYLE called on the House of Stainless sales engineer for a steel that would meet the DOYLE standards of performance. This steel would have to effectively resist certain corrosive materials, provide the strength required for long service life, and maintain its attractive appearance. Not only did the sales engineer recommend the stainless steel that met these requirements, but he also gave the company valuable assistance in fitting the new material into their production picture. Now, corrosion problems have been solved, and DOYLE can supply an outstanding product for any cleaning job.

Where there is a specific problem, there usually is a stainless steel that can solve it. And even where there is no specific problem, many manufacturers have found that a switch to stainless often makes a good product an outstanding one. The House of Stainless will welcome the opportunity to counsel with you on your individual requirements. Whatever you may need in stainless steel, you can expect prompt deliveries from our complete warehouse stocks or from mill shipments through our mill placement department.

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Milwaukee District Office: 757 North Broadway, Milwaukee 2, Wisc. Telephone BRoadway 3-7874
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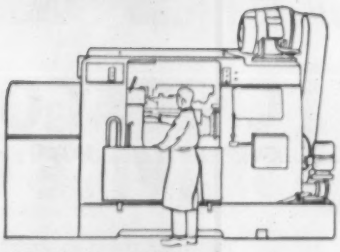
A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1755 North Broadway, Albany 1, N. Y.



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NEW PRODUCTS and equipment

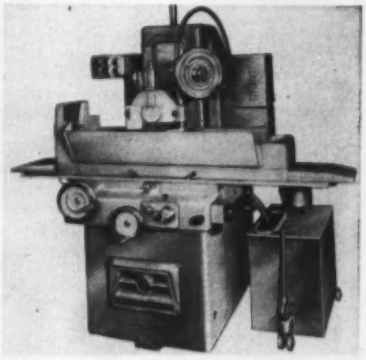
ment) results in faster drilling of deep holes and less drift.

The attachment is available in three speeds: 315, 1550 and 3550 rpm. Maximum capacity is ⅜-in. in steel. *Write*: E. F. Vilter Sales Inc., 4161 N. Richards St., Milwaukee 12, Wis. *Phone*: Edgewood 2-7810

Surface Grinder

This machine has hydraulic feed. Its table has a working surface which is 8 x 24 in. Capacity: 12 in. under a wheel 10-in. in diameter.

Longitudinal table speeds range from 3 in. to 125 ft a minute. The hydraulic crossfeed is variable up to a maximum of ⅜-in. per table reversal.



The grinding wheel spindle is driven through V-belts by a 2-hp, ball-bearing motor mounted on an adjustable bracket on the head of the machine. Two spindle speeds are provided. The hydraulic mechanism is driven by a 1-hp, ball-bearing motor. *Write*: Gallmeyer & Livingston Co., Grand Rapids 2, Mich. *Phone*: 9-8391

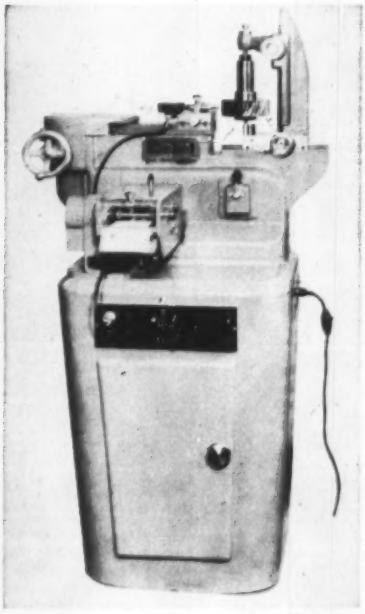
Tooth Space Comparator

Automatic checking of a gear while it is in motion is featured. The machine operates with a dual finger check.

A fixed finger moves in a circle to index the workgear or similar workpiece. The checking finger contacts adjacent profiles about one circular pitch apart. As the machine travels, each tooth is checked for position and graphed on a chart. By analyzing the chart, the accumulated spacing and maxi-

mum out-of-position errors can be found.

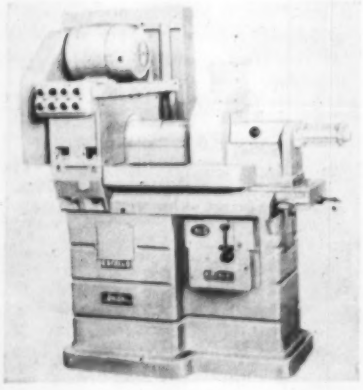
These checks can be made using standard and special fingers: Tooth-to-tooth check (spur and helical gears); pitch diameter run-



out and size from hole check; variations in tooth thickness; lead variation and accumulated spacing. *Write*: Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. *Phone*: Capitol 7-2200

Precision Boring

Smooth table movement, versatile machine cycles and work feeds produce deep, clean, accurate holes. This high production process is related to gun drilling. Cored holes



Jet airpower is the backbone of America's defense, and jet engines depend upon scientifically exact turbine vanes, turbine blades and supercharger buckets for power and performance.

To mass-manufacture these vital precision parts, Austenal applies the ancient "lost wax" method of investment casting, greatly improved and now called Microcast – a technique so precise and so accurate that Austenal turbine buckets and vanes eliminate costly machining and require only a minimum of finishing.

The Microcast process was developed by Austenal, and its use in the manufacture of vital jet components is only one of many applications. In every field of industry, Microcast is proving that complex, intricate metallic parts can be made better and more economically by investment casting.

Let Austenal show you how Microcast can help brighten your production picture.

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THIN STRIP

±.0004″ is run-of-the-mill

Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004″ or less on gages from .010″ down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020″, and copper and its alloys from .012″ both down to .00075″.

If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
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Somers Brass Company, Inc.
WATERBURY, CONN.

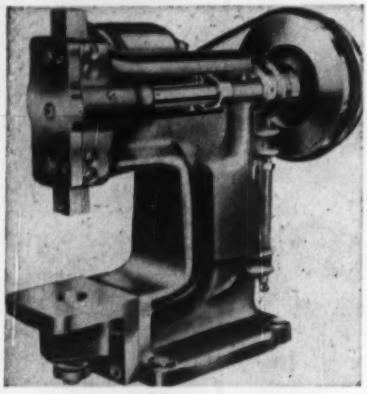
NEW PRODUCTS and equipment

in castings can be finish machined in one operation.

The part to be drilled is clamped to a simple fixture and held stationary. Coolant is supplied under high pressure through the gun-type drill. It washes the chips out through the single flute and dissipates heat. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Punch Press

This is a bench unit for slotting, cutting, pinking, scoring, marking, embossing, perforating, creasing and punching. It has a 4½-in. throat, extra long 1½ and 2 in. main bearings. It is foot operated.



Production capacity is 250 strokes a minute. It has a direct V-belt drive and a 1/3-hp motor. *Write*: Punch Press Dept., Alva Allen Industries, Clinton, Mo. *Phone*: 1286-87

Metal Sorter

This hand sorter makes the testing of metal parts rapid and inexpensive.

The unit is adjusted by inserting a known and acceptable part in the test coil. Unknowns placed in the coil give the same meter reading if they are the same as the standard, a different reading if they are not. Several thousand parts a day can be sorted.

Either ferrous or nonferrous metals can be tested. Test coils with any size opening are available. *Write*: J. W. Dice Co., Englewood, N. J. *Phone*: 4-0471

Somers
UNIGRAIN®
thin strip brass for deep drawing

with
Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010″ and .00075″.

If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

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Somers Brass Company, Inc.
WATERBURY, CONN.

ANTISEP the all-purpose water-soluble cutting base

Machine tools pay off in extra profits when **ANTISEP** is on the job

Since profits from machining depend primarily on production, using Antisep All-Purpose Cutting Base is the wisest thing you can do.

Because, *you get more output per machine* with Antisep. It enables you to increase both speed and feed. It has anti-welding properties and exceptional lubricity that produce better finishes with minimum rejects.

Antisep, besides, is most economical to use. Low initial cost, combined with solubility in an effective 25-to-1 dilution with water, means you pay 8c per gallon in the machine!

Make a decision now to increase the profits from your machining operations. Call the Houghton Man to arrange a convincing test. Meantime, get latest Antisep bulletin by writing E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Penna.

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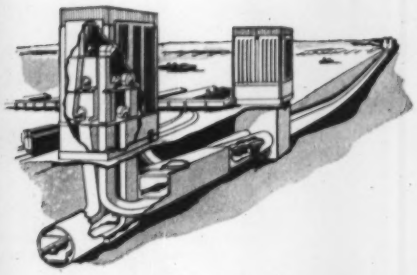
Ready to give you on-the-job service . . .

Morse equipment helps ventilate Lincoln Tunnel for 18 years — without replacements!



Lincoln Tunnel: Operated by The Port of New York Authority, it is a major artery connecting mid-Manhattan with New Jersey.

Here, 26 blowers and 30 exhaust fans circulate millions of cubic feet of air per minute through the tunnel. Because these ventilation units provide a complete change of air in the tunnel every 1½ minutes, they require dependable power transmission equipment. It is significant that Morse power transmission equipment is used in many of these units.

Shown at left is a typical blower unit, which employs a 6 in. Morse Silent Chain operating at 7½ hp at 445 rpm or 60 hp and 884 rpm. This unit, as well as the others in the ventilation system, has been operating for 18 years with little maintenance, and no breakdowns.

Check These Advantages of Morse Equipment:

- Long service life
- Low operating cost
- Easy to assemble, disassemble
- Require minimum maintenance
- Wide range of types and sizes
- Precision construction

Morse Power Transmission equipment gives reliable, economical performance in unusual applications.

Look into the complete line of Morse Power Transmission products which you can employ in your own design applications. Morse has skilled engineers available to help you solve practically any problem involving transmission equipment: Roller Chain, Silent Chain, Sprockets, Clutches, and Couplings.

MORSE CHAIN COMPANY,
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MORSE BW **CHAINS, CLUTCHES, AND COUPLINGS**

NEW literature

Write directly to the company for a copy

Shaped Tubing

Here is information on analyses, tool charges, size range, tolerances, lengths and temper of shaped, step-tapered and mechanical tubing—data memorandum 17, 3 pages. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Magnets

Suspension of magnets over conveyor belts is pictured and effective range of magnets and recommended belt speeds are given—catalog 114, 4 pages. Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Cleveland, O.

Spectrometers

Engineering treatment of the instrument is accompanied by a file folder describing economic advantages—bulletin 44. Dept. SN, Baird Associates Inc., 33 University Rd., Cambridge 38, Mass.

Speed Control

Package drives for machine tools and other uses come in five cabinet sizes with drive motor ranges from 5 to 150 hp—bulletin 51B8166, 8 pages. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Extension Spring

Design and application of a new constant-force, elastic member is given—bulletin 31OE-6-55, 24 pages. Neg'ator Division, Hunter Spring Co., Lansdale, Pa.

Steel Heat Absorption

A simplified method for calculating the heating rate of steel and predicting the center temperature is given—32 pages. Bloom Engineering Co. Inc., 857 W. North Ave., Pittsburgh 33, Pa.

Molybdenum

Presented are technical and fabricating data on arc-cast molybdenum —72 pages. Director of Technical Information, Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Roller Conveyors

Medium and heavy-duty conveyors are described—catalog 60A, 20 pages. E. W. Buschman Co., Clifton & Spring Grove Ave., Cincinnati 32, O.

Welding Cable

Detailed tables help you select cable in terms of adequate capacity for the job, current flow and cable length—20 pages. Uniflex Cable Division, United Metal Craft Co., 800 Lowell St., Ypsilanti, Mich.

Socket Screws

Here's a handy data file covering seven types of socket screws and keys—Mac-it Screw Division, Strong, Carlisle & Hammond Co., 1392 W. Third St., Cleveland 13, O.

Enclosed Switches

This aid to the plant engineer, maintenance man and designer details a variety of switches for either alternating or direct current industrial uses—catalog 83, 28 pages. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Air Compressor

A high-capacity, piston-type air compressor that delivers oil-free air is covered—12 pages. Bell & Gossett Co., Morton Grove, Ill.

Excavators

Action photos show a complete line of excavating and materials handling machines—bulletin 403-C, 40 pages. Marion Power Shovel Co., Marion, O.

Bucket Cranes

Here's help for users of overhead traveling cranes who want top cable life and performance from clamshells —form 2510, 8 pages. Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

Immersion Heating

Described is equipment for heating liquid or organic solutions by combustion of an air-gas mixture within a pipe or coil immersed in the liquid —bulletin H-11, 4 pages. Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill.

Diecasting Machine

Complete engineering data of a low-cost, high-speed machine with shot capacities up to 2½-lb are given —4 pages. American Die Casting Machinery Co., 1516 W. Thomas St., Chicago 22, Ill.

Temperature Instruments

Filled thermal systems for indicating, recording, controlling, transmitting, compensating and programming temperatures from −400 to 1000° F are described—catalog 12-A-10, 24 pages. Fischer & Porter Co., Hatboro, Pa.

Battery Care

This manual tells users of battery-powered industrial trucks how to organize training courses—44 pages. Gould-National Batteries Inc., Trenton, N. J.

Specialty Steel Guide

Distinctive characteristics of a broad range of special-purpose steels are defined in terms of end use—32 pages. Carpenter Steel Co., 339 West Bern St., Reading, Pa.

Cold Drawn Steels

Properties and applications of cold drawn carbon steels, free machining steels, stress relieved steels, leaded and alloy steels are summarized—booklet Adv-672, 32 pages. Advertising Division, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Metal Finishing and Plating

Here is a file folder that can be used as a stock record for finishing supplies and as a first-aid chart for plating rooms. Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich.

Industrial Fans

Performance data and installation drawings of V-belt-driven fans are given—bulletin 7214, 4 pages. American Blower Corp., Detroit 32, Mich.

Stainless Steel

AM 350, a chromium-nickel-molybdenum stainless steel, is described —10 pages. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Steel Shelving

Information on planning a steel shelving layout and illustrations of the units are given—32 pages. Borroughs Mfg. Co., 3002 N. Burdick, Kalamazoo, Mich.

Electric Fork Trucks

Battery-powered trucks, their dimensions, capacities, weights, speeds and construction features are tabulated—bulletin 1327D, 6 pages. Baker-Raulang Co., Cleveland 2, O.

Rod Parting

Specifications and capacities of hand and power-operated rod parters are given—14 pages. O'Neil-Irwin Mfg. Co., 619 Eighth Ave., Lake City, Minn.

Aluminum Alloy Selector

Here is a slide rule that gives specifications for every major aluminum alloy used in sand and permanent molding. Howard Foundry Co., 1700 N. Kostner Ave., Chicago 39, Ill.

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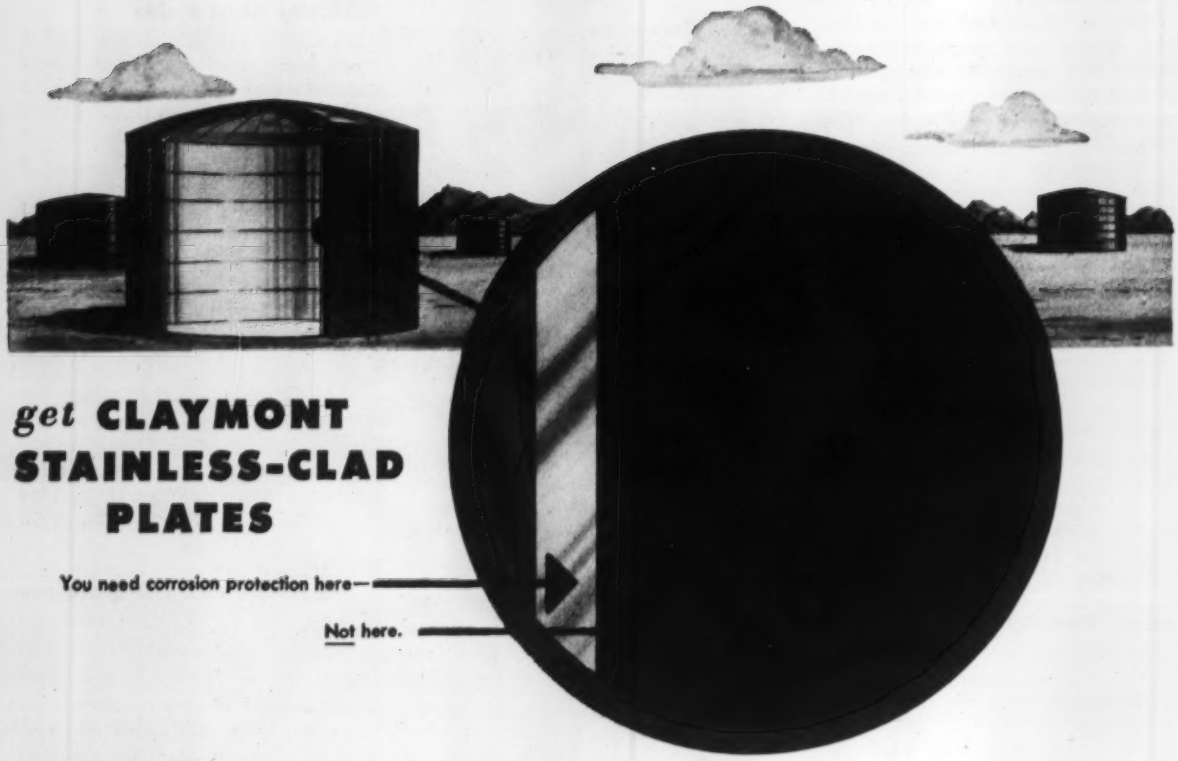

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■ You pay only for the stainless steel you can use when you buy Claymont Stainless-Clad Steel Plates. That's because these plates combine the low cost of the carbon steel backing with the corrosion resistance of the stainless steel cladding. This means that Claymont Stainless-Clad Steel Plates give the same kind of protection that you expect from much-more-expensive solid stainless steel.

Produced in our plant to exacting standards, these plates are manufactured with painstaking care under personalized supervision. What's more, our facilities provide definite assurance of prompt delivery.

It's quite likely that you can use this economical protection to great advantage in your fabrication of tanks, vessels, processing equipment and other applications. Why not get the full details today? Just contact our nearest sales office, or write to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

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STEEL

September 19, 1955

Market Outlook

YOU can bet there'll be a hefty expansion of steel capacity.

Now focusing attention on the subject is a recommendation by the Iron & Steel Division of the Business & Defense Services Administration that new expansion goals be set up.

Two weeks ago, STEEL (Sept. 5, p. 41) reported a big expansion is bound to come. In the same week, Republic Steel Corp., Cleveland, announced it would start immediately on a 1.6-million-ton expansion program that would raise its capacity 16 per cent and cost more than $130 million.

ANOTHER VOICE—Now BDSA recommends the nation's ingot capacity be boosted from today's 125.8 million tons to 150 million by 1960 to provide a sufficient margin (18 million tons) for defense. The BDSA believes today's capacity should be 135 million tons, to allow 18 million as a defense margin above high-level civilian demand. To encourage expansion, the government again should authorize accelerated amortization for steel industry projects, BDSA says.

CUSHION GONE—Helping point up the needs for steel industry expansion is the currently strong demand for steel. Growth of civilian demand, the BDSA asserts, has absorbed much of the margin orginally created for defense by the steel expansion program which followed the Defense Production Act of 1950. Further steel industry expansion is required today to carry out the policy of the Defense Production Act of 1955, BDSA says.

PRODUCTION UP—The continued high demand for steel pushed steel ingot production up further —2 points in the week ended Sept. 18. This raised operations up to 95.5 per cent of capacity, highest rate since mid-June. Assisting in this recovery are a return of moderate temperatures and completion of summer vacations. Some mills are operating at the highest level in more than two years.

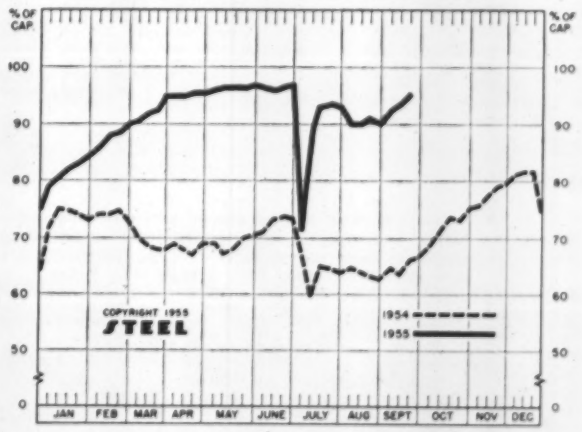
Despite handicaps of hot weather and vacations, mills set a new production record in August. Although ingot output was at only 89.6 per cent of capacity, the yield was 9,583,000 net tons—highest August figure on record.

CRITICAL—While most every form of steel is in strong demand, the tightest are structural shapes and plates. Their shortage is restricting some fabricators to four-day-a-week operations. Part of the squeeze on supply comes from flood rehabilitation needs in the Northeast. Some relief in supply of structural shapes, particularly wide flange beams, will come from new capacity this fall.

NO LET-UP—The auto industry gives no promise that it will ease up in its demand for steel. Car sales continue high, and arrival of 1956 models is expected to give sales a fillip. High production of autos pulls heavily on cold-rolled steel sheets, the steel mills' biggest product tonnagewise. In the first half of this year, 18 per cent of mill shipments were cold-rolled sheets—and the auto industry took 54 per cent of them.

PRICES—In general, they are unchanged. STEEL's price composite on finished steel holds at $127.41 a net ton. STEEL's composite on steelmaking scrap, at $44.33 a gross ton, is up 33 cents. Standard plate washers are up $5 a ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Sept. 18	Change	Same Week 1954	Same Week 1953
Pittsburgh	97.5	+ 3.5*	66	94.5
Chicago	97.5	0*	89	101.5
Mid-Atlantic	93	— 1	60	97
Youngstown	100	+ 2	51.5	106
Wheeling	97	+ 3.5	90	98
Cleveland	98	+ 3.5*	77.5	101
Buffalo	105	0	56.5	26
Birmingham	95.5	+ 2	75	96
New England	86	+ 5	50	87
Cincinnati	89.5	+ 0.5	52	79.5
St. Louis	106	+ 21.5	66.5	96
Detroit	94	+ 3.5*	68	101
Western	103	0	81	99.5
National Rate	95.5	+ 2	66	90

INGOT PRODUCTION‡

	Week Ended Sept. 18	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	142.9†	140.9	135.5	99.5
NET TONS (In thousands)	2,295†	2,264	2,176	1,583

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 53 Technical Outlook—p. 111

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Sept. 13 1955	Sept. 6 1955	Month Ago	Aug. Average
(1947-1949=100)	153.9	153.9	153.9	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical Stainless, 304 (100 ft)	180.952
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.533
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.333
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale Ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 14 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	207.63	207.63	207.63	194.19	156.99
Index in cents per lb	5.625	5.625	5.625	5.261	4.253

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.41	$127.41	$127.41	$117.77	$94.50
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	46.85
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	45.97
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	47.49
Steelmaking Scrap, GT	44.33	44.00	44.33	29.75	41.08

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point

FINISHED STEEL	Sept. 14 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.10-4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.50	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25-6.45	6.25-6.45	6.25-6.45	5.75	4.15-4.50
Strip, C.R., Chicago	6.35-6.45	6.35-6.45	6.35-6.45	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, 7/32-9/16" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$48.50
Basic, Valley	58.50	58.50	58.50	56.00	46.00
Basic, deld. Phila.	59.16	59.16	59.16	49.66	50.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, deld. Phila.	59.66	59.66	59.66	50.16	50.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.43	49.08
Malleable, Valley	59.00	59.00	59.00	56.50	46.50
Malleable, Chicago	59.00	59.00	59.00	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$43.50	$43.50	$44.50	$30.50	$44.00
No. 1 Heavy Melt, E. Pa.	46.50	46.50	46.00	28.75	39.25
No. 1 Heavy Melt, Chicago	42.00	42.00	42.00	30.00	40.00
No. 1 Heavy Melt, Valley	46.50	46.50	46.50	32.50	43.75
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	28.50	43.25
No. 1 Heavy Melt, Buffalo	38.50	39.50	39.50	26.50	41.50
Rails, Rerolling, Chicago	64.50	64.50	64.50	44.50	59.50
No. 1 Cast, Chicago	46.50	46.50	46.50	35.50	49.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$14.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	16.00
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

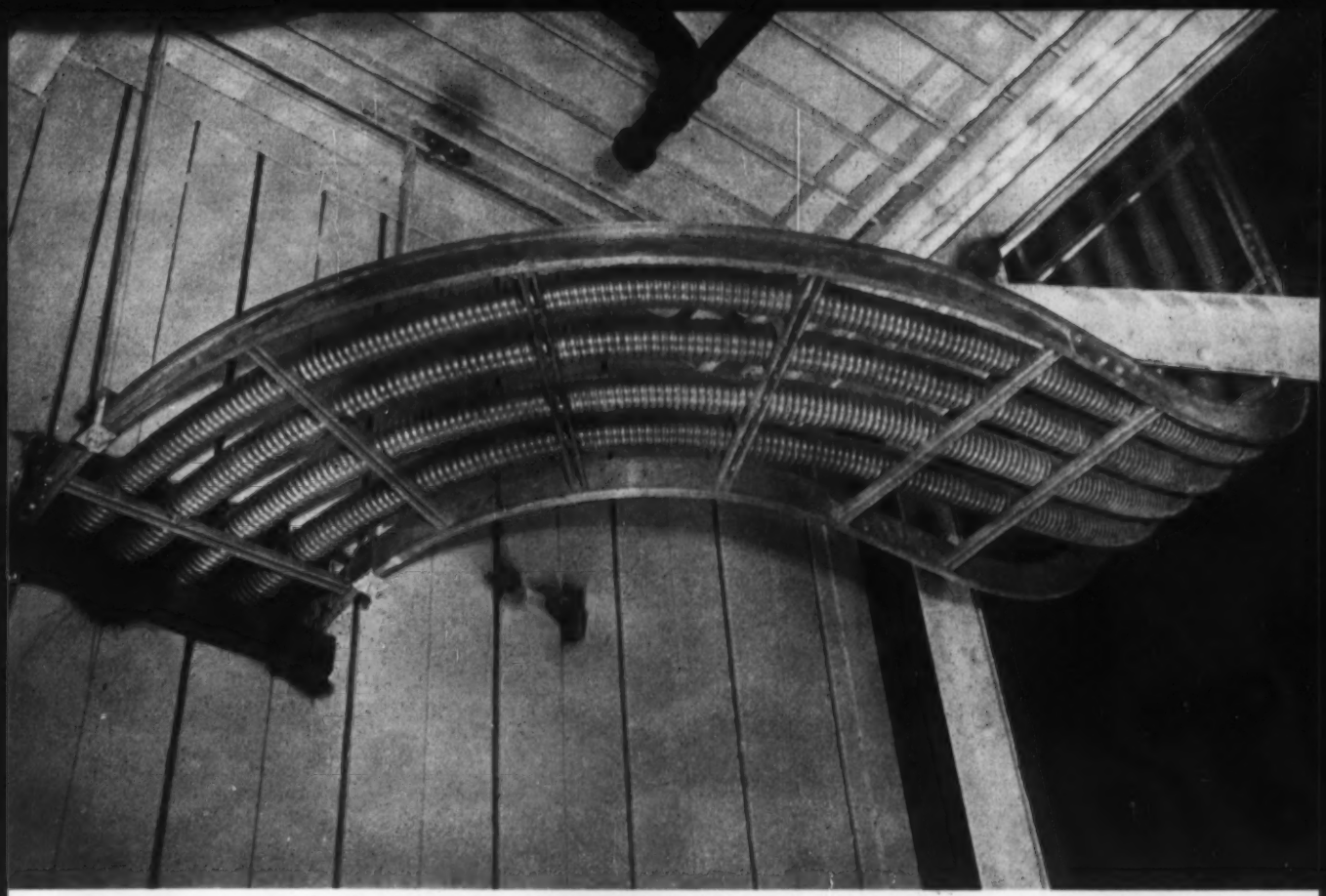
Daily Nonferrous Price Record

	Price Sept. 14	Last Change	Previous Price	Aug. Avg.	July Avg.	Sept. 1954 Avg.
Copper	43.00	Sept. 1, 1955	40.00-43.00	37.759	36.000	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	14.400
Zinc	13.00	Sept. 6, 1955	12.50	12.500	12.500	11.900
Tin	97.25	Sept. 14, 1955	97.00	96.519	97.045	93.545
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.267	23.200	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	30.574	28.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



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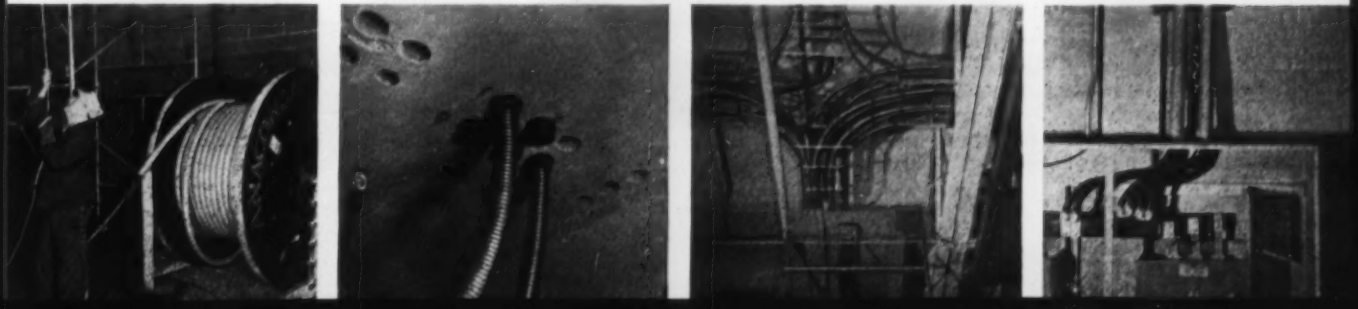


Nonferrous Metals

Of seven major nonferrous metals, only nickel and lead have held the price line so far this year. The rest of 1955 should be marked by stability

Nonferrous Metal Prices, Pages 152 & 153

METAL PRICES have just about hit the top for 1955, although increasingly tight supply in some cases could force another move before the end of the year.

As the chart shows, among the major primary metals only nickel and lead have maintained a steady price for the first nine months. All others have tended to show the strength in the market.

Wide Gap—Copper still is the big question mark. Not only is the London price higher than the domestic producers' quotation, but at least two custom smelters are selling for 50 cents a pound. And demand is getting heavier despite the washout in Connecticut. Producers would like to hold out at 43 cents until the situation settles down, but it's going to be difficult to resist the pressures to move up with the world market.

Aluminum is not likely to move up any more this year. There are slight adjustments going on in the alloy prices, but the hike on primary after the labor contract was signed will hold. The industry doesn't have the perplexing problems of the copper market. The only immediate problem is supplying the increasingly heavy demand.

Pals—Zinc and lead go hand in hand on the price structure, and after this month's advance in zinc, the rest of the year should be pretty stable. Some quarters are talking of higher-priced lead, but it is doubtful if the government would pay more than the combined price of 28 cents for the two metals.

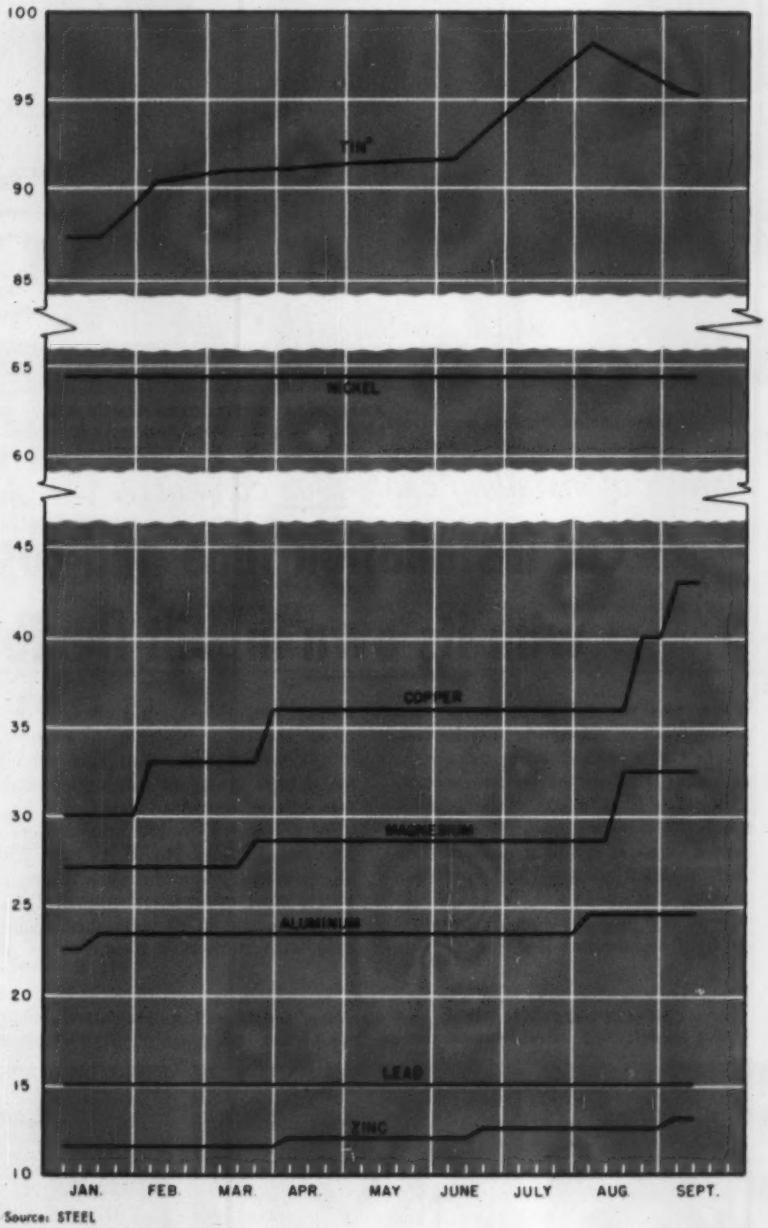
Tin probably is the most unstable of the major metals, although its price fluctuations of the last two months have been within a 2-cent range. Most authorities believe supply and demand will be in delicate balance for the rest of the year. If so, such disturbances as the dock strike on the East Coast may cause supply to get tighter in the immediate future and result in slightly higher prices.

Stage Is Set — Although nickel could go up at any minute, there are no signs it will. Conditions are just about right for a boost, however. International Nickel Co. employees have a new labor contract. The metal has been at 64.50 cents a pound since last November. Metal on the outside market is selling for as much as $2.25 a pound. And demand is stronger than ever.

Magnesium will hold at its new price of 32.50 cents a pound. While demand from civilian consumers is showing up stronger this year than last year, there is still no pressure on supply.

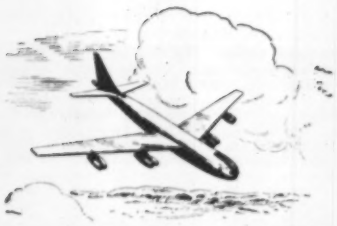
Metals Prices Reflect Strong Market Demand

(Cents Per Pound)



Source: STEEL

*First week of the month only



WE'RE POURING MORE AIRCRAFT-QUALITY ALLOYS AT

Newport Steel

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Aircraft-quality alloys are extremely important these days, and Newport constantly is increasing production of this vitally needed material. Our seventy years' fine steel-making experience, our quality control, and specialized equipment for rolling sheets and plates, ensure steel to the exact specification of each customer. In addition to these aircraft-quality alloys we produce the steel products listed below. Look over the list, then let us discuss your needs and our qualificationsto-deliver what you want when you want it.

PRODUCTS OF NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

Newport Steel

CORPORATION

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YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80, No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; Lake 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9% $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom, per troy oz.

Lead: Common, 14.80, chemical, 14.90, corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 99%+, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $90-$94 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 97.25; prompt, 95.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, E. St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade, 14.50, deld. Diecasting alloy ingot No. 3, 17.25; No. 2, 18.25; No. 5, 17.75, deld.

Zirconium: Ingots, commercial grade, 14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.25-33.00; No. 12 foundry alloy (No. 2 grade), 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.25; 13 alloy, 0.60 Cu max, 32.00-32.25; 195 alloy, 32.25; 108 alloy, 30.50. **Steel deoxidizing** grades, notch bars, granulated or shot: Grade 1, 31.25; grade 2, 30.25; grade 3, 29.50; grade 4, 29.00.

Brass Ingot: Red brass No. 115, 42.50; tin bronze No. 225, 56.50; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 34.75; manganese bronze No. 421, 38.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l., 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $20 per cwt; pipe, full coils, $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4		
0.156-0.172	57.5	55.9		
0.188	57.5	55.9		71.7
0.219-0.234	54.5	52.9		
0.250-0.281	54.5	52.9		68.4
0.313	54.5	52.9		65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1		52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9		
1.625-2.000	48.2	46.2		50.5
2.125-2.500	47.0	45.0		
2.563-3.375	45.6	43.6		

ALUMINUM

Sheets and Circles: 110 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3		
0.135-0.096	38.0	43.2		
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.039	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0		39.4	45.4
0.016-0.015	43.9		40.2	46.6
0.014	44.9		41.2	47.9
0.013-0.012	46.1		41.9	48.9
0.011	47.1		43.1	50.5
0.010-0.0095	48.4		44.3	52.2
0.009-0.0085	49.7		45.8	54.3
0.008-0.0075	51.3		47.0	56.1
0.007	52.8		48.5	58.4
0.006	54.4		49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate, 66.00c 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ⅛ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ⅛-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 18.50-19.50; old sheets, 15.00-17.50; borings and turnings, 10.50-11.50; crankcases, 15.50-17.50; industrial castings, 14.50-17.00.

Copper and Brass: No. 1 heavy copper and wire, 38.00-38.50; No. 2 heavy copper and wire, 37.00-37.50; light copper, 35.00-35.50; No. 1 composition red brass, 29.50-30.00; No. 1 composition turnings, 28.50-29.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76b	60.36c	....	62.82	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.625	37.375	36.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	25.750
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 18.50-19.00; new brass clippings, 25.00-25.50; light brass, 18.50-19.00; heavy yellow brass, 22.00-22.50; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 23.00-23.50; cocks and faucets, 24.50-25.00; brass pipe, 25.50-26.00.

Lead: Heavy, 11.50-12.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.25; electrotype, 12.00-12.50; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 44.50; old sheets, 46.00; turnings, 34.00; rods, 44.50.

Nickel: Sheets and clips, 82.00-92.00; rolled anodes, 82.00-92.00; turnings, 65.00-75.00; rod ends, 82.00-92.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 5.00-5.50; old die-cast scrap, 3.50-3.75.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.50-23.00; 3003 clippings, 22.25-23.00; 6151 clippings, 22.00-23.00; 5052 clippings, 22.00; 2014 clippings, 21.50; 2017 clippings, 21.50; 2024 clippings, 21.50; mixed clippings, 21.50-22.00; old sheet, 19.00-19.50; old cast, 19.00-19.50; clean old cable (free of steel), 22.00-23.00; borings and turnings, 19.00-20.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 copper and wire, 42.50-43.00; No. 2 copper and wire, 41.00; light copper, 38.75; refinery brass (60% copper) per dry copper content, 37.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper and wire, 42.50-43.00; No. 2 copper and wire, 41.00; light copper, 38.75; No. 1 composition borings, 33.50-34.00; No. 1 composition solids, 34.00-34.50; heavy yellow brass solids, 24.00-25.50; yellow brass turnings, 23.00-25.00; radiators, 26.00-27.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 5942, oval, 58.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 62.54, 5000-10,00 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.155 200-499 lb, $1.14, 500-999 lb, $1.135; 1000 lb or more, $1.13.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 76.80; 200 lb, 76.05; 300 lb, 75.80; 400-900 lb, 75.05; 1000 lb and over, 73.05; effective Mar. 24, 1955.

Copper Sulphate: Crystal, 100 lb, 21.50; 200 lb, 18.50; 300 lb, 17.50; 400 lb, 17.00; 500-1900 lb, 15.50; 2000-10,000 lb, 15.25; 10,000 lb and up, 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, efective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1955.

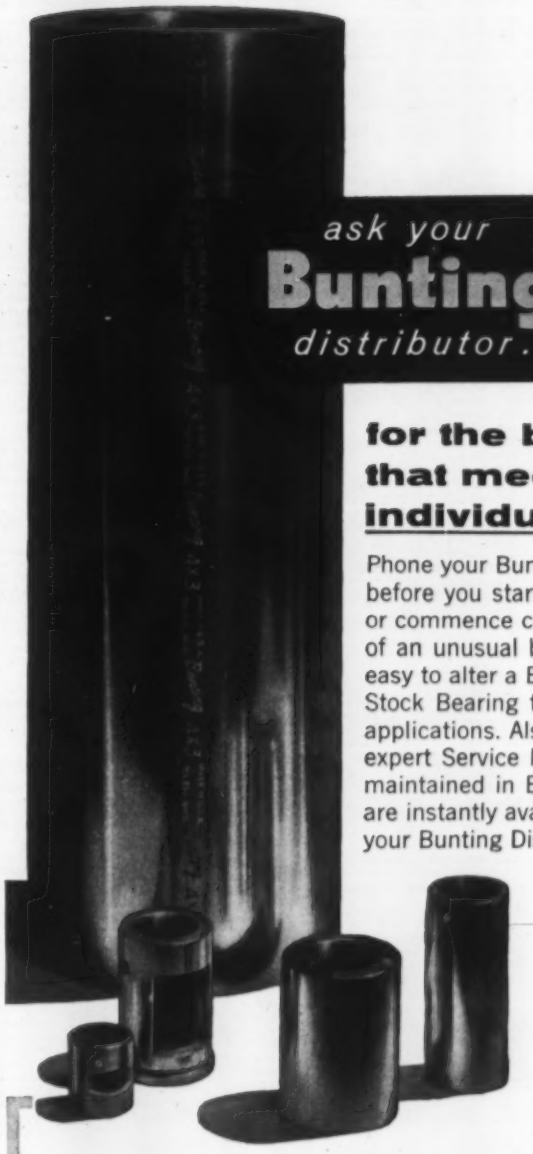
Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.00; 100-600 lb, 58.6; 700-1900 lb, 56.1; 2000-9900 lb, 54.4; 10,000 lb or more, 53.2.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.594; 50 lb, $1.254; 100-300 lb, $1.104; 400-900 lb, $1.08; 1000-1900 lb, $1.055; 2000-4900 lb, $1.019; 5000-19,900 lb, 95.8; 20,000 lb or more, 89.7.

Stannous Sulphate: Less than 500 lb, $1.293; 50 lb, 99.30; 100-1900 lb, 97.30; 2000 lb or more, 95.3.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.



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THE BUNTING BRASS AND BRONZE COMPANY, TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 155. Key to footnotes, page 157.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall, Pa. U5 ....$65.50

INGOTS, Alloy (NT)
Detroit R7 ....$69.00
Houston 85 ....74.00
Midland, Pa. C18 ....69.00
Munhall, Pa. U5 ....69.00

BILLETS, BLOOMS & SLABS Carbon, rerolling (NT)
Aliquippa, Pa. J5 ....$68.50
Bessemer, Pa. U5 ....68.50
Bridgeport, Conn. N19 ..73.50
Buffalo R2 ....68.50
Clairton, Pa. U5 ....68.50
Ensley, Ala. T2 ....68.50
Fairfield, Ala. T2 ....68.50
Fontana, Calif. K1 ....76.00
Gary, Ind. U5 ....68.50
Johnstown, Pa. B2 ....68.50
Lackawanna, N.Y. B2 ..68.50
LoneStar, Tex. L6 ....74.50
Munhall, Pa. U5 ....68.50
Pittsburgh J5 ....68.50
S. Chicago, Ill. R2, U5..68.50
S. Duquesne, Pa. U5 ..68.50
Youngstown R2 ....68.50

Carbon, Forging (NT)
Aliquippa, Pa. J5 ....$84.50
Bessemer, Pa. U5 ....84.50
Bridgeport, Conn. N19..89.50
Buffalo R2 ....84.50
Canton, O. R2 ....86.50
Clairton, Pa. U5 ....84.50
Conshohocken, Pa. A3..89.50
Ensley, Ala. T2 ....84.50
Fairfield, Ala. T2 ....84.50
Fontana, Calif. K1 ....92.00
Gary, Ind. U5 ....84.50
Geneva, Utah C11 ....84.50
Houston 85 ....89.50
Johnstown, Pa. B2 ....84.50
Lackawanna, N.Y. B2..84.50
LosAngeles B3 ....94.00
Midland, Pa. C18 ....84.50
Munhall, Pa. U5 ....84.50
Pittsburgh J5 ....84.50
Seattle B3 ....98.00
S. Chicago R2, U5, W14 ..84.50
S. Duquesne, Pa. U5 ..84.50
S. SanFrancisco B3 ....94.00

Alloy, Forging (NT)
Bethlehem, Pa. B2 ...$96.00
Buffalo R2 ....96.00
Canton, O. R2, T7 ....96.00
Conshohocken, Pa. A3..103.00
Detroit R7 ....96.00
Fontana, Calif. K1 ....115.00
Gary, Ind. U5 ....96.00
Houston 85 ....101.00
Ind. Harbor, Ind. Y1 ...96.00
Johnstown, Pa. B2 ....96.00
Lackawanna, N.Y. B2 ..96.00
LosAngeles B3 ....116.00
Massillon, O. R2 ....96.00
Midland, Pa. C18 ....96.00
Munhall, Pa. U5 ....96.00
S. Chicago R2, U5, W14..96.00
S. Duquesne, Pa. U5 ...96.00
Struthers, O. Y1 ....96.00
Warren, O. C17 ....96.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$103.50
Canton, O. R2 ....103.50
Cleveland R2 ....103.50
Gary, Ind. U5 ....103.50
S. Chicago R2, W14 ....103.50
S. Duquesne, Pa. U5 ...103.50

SKELP
Aliquippa, Pa. J5 ....4.325
LoneStar, Tex. L6 ....4.625
Munhall, Pa. U5 ....4.225
SparrowsPoint, Md. B2..4.225
Warren, O. R2 ....4.225
Youngstown R2, U5 ...4.225

WIRE RODS
AlabamaCity, Ala. R2 ..5.025
Aliquippa, Pa. J5 ....5.025
Alton, Ill. L1 ....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 ....5.025
Donora, Pa. A7 ....5.025
Fairfield, Ala. T2 ....5.025
Houston 85 ....5.275
IndianaHarbor, Ind. Y1..5.025
Johnstown, Pa. B2 ....5.025
Joliet, Ill. A7 ....5.025
KansasCity, Mo. 85 ....5.275
Kokomo, Ind. C16 ....5.125
LosAngeles B3 ....5.825
Minnequa, Colo. C10....5.275
Monessen, Pa. P7 ....5.025
N. Tonawanda, N.Y. B11..5.025
Pittsburg, Calif. C11 ...5.675
Portsmouth P12 ....5.025
Roebling, N.J. R5 ....5.125
S. Chicago, Ill. R2 ....5.025
SparrowsPoint, Md. B2..5.125
Sterling, Ill. (1) N15 ....5.025
Sterling, Ill. N15 ....5.125
Struthers, O. Y1 ....5.025
Worcester, Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes
Ala. City, Ala. R2 ....4.60
Aliquippa, Pa. J5 ....4.60
Bessemer, Ala T2 ....4.60
Bethlehem, Pa. B2 ....4.65
Birmingham C15 ....4.60
Clairton, Pa. U5 ....4.60
Fairfield, Ala. T2 ....4.60
Fontana, Calif. K1 ....5.25
Gary, Ind. U5 ....4.60
Geneva, Utah C11 ....4.60
Houston 85 ....4.70
Ind. Harbor, Ind. I-2 ....4.60
Johnstown, Pa. B2 ....4.65
KansasCity, Mo. 85 ....4.70
Lackawanna, N.Y. B2 ...4.65
LosAngeles B3 ....5.30
Minnequa, Colo. C10 ....4.90
Munhall, Pa. U5 ....4.60
Niles, Calif. P1 ....4.90
Portland, Oreg. O4 ....5.35
Phoenixville, Pa. P4 ....5.15
Seattle B3 ....5.35
S. Chicago U5, W14 ....4.60
S. SanFrancisco B3 ....5.25
Torrance, Calif. C11 ....5.30
Weirton, W. Va. W6 ....4.60

Wide Flange
Bethlehem, Pa. B2 ....4.65
Clairton, Pa. U5 ....4.60
Fontana, Calif. K1 ....5.40
Lackawanna, N.Y. B2 ...4.65
Munhall, Pa. U5 ....4.60
Phoenixville, Pa. P4 ....5.15
S. Chicago, Ill. U5 ....4.60

Alloy Std. Shapes
Clairton, Pa. U5 ....5.65
Fontana, Calif. K1 ....7.30
Gary, Ind. U5 ....5.65
Houston 85 ....5.75
Munhall, Pa. U5 ....5.65
S. Chicago, Ill. U5 ....5.65

H.S., L.A. Std. Shapes
Aliquippa, Pa. J5 ....6.75
Bessemer, Ala. T2 ....6.75
Bethlehem, Pa. B2 ....6.80
Clairton, Pa. U5 ....6.75
Fairfield, Ala. T2 ....6.75
Fontana, Calif. K1 ....7.40
Gary, Ind. U5 ....6.75
Geneva, Utah C11 ....6.75
Houston 85 ....6.85
Ind. Harbor, Ind. I-2, Y1..6.75
Johnstown, Pa. B2 ....6.80
KansasCity, Mo. 85 ....6.85
Lackawanna, N.Y. B2 ...6.80
LosAngeles B3 ....7.45
Munhall, Pa. U5 ....6.75
Seattle B3 ....7.50
S. Chicago, Ill. U5, W14..6.75
S. SanFrancisco B3 ....7.40
Struthers, O. Y1 ....6.75

H.S., L.A. Wide Flange
Bethlehem, Pa. B2 ....6.80
Lackawanna, N.Y. B2 ...6.80
Munhall, Pa. U5 ....6.75
S. Chicago, Ill. U5 ....6.75

PILING

BEARING PILES
Bethlehem, Pa. B2 ....4.65
Lackawanna, N.Y. B2 ...4.65
Munhall, Pa. U5 ....4.60
S. Chicago, Ill. U5 ....4.60

STEEL SHEET PILING
Ind. Harbor, Ind. I-2 ....5.45
Lackawanna, N.Y. B2 ...5.45
Munhall, Pa. U5 ....5.45
S. Chicago, Ill. U5 ....5.45

PLATES

PLATES, Carbon Steel
Ala. City, Ala. R2 ....4.50
Aliquippa, Pa. J5 ....4.50
Ashland, Ky. (15) A10 ...4.50
Bessemer, Ala. T2 ....4.50
Bridgeport, Conn. N19 ..4.75
Buffalo R2 ....4.50
Clairton, Pa. U5 ....4.50
Claymont, Del. C22 ....4.50
Cleveland J5, R2 ....4.60
Coatesville, Pa. L7 ....4.50
Conshohocken, Pa. A3 ..4.50
Detroit M1 ....4.60
Ecorse, Mich. G5 ....4.60
Fairfield, Ala. T2 ....4.50
Fontana, Calif. (30) K1 ..5.15
Gary, Ind. U5 ....4.50
Geneva, Utah C11 ....4.50
GraniteCity, Ill. G4 ....4.70
Harrisburg, Pa. C5 ....5.10
Houston 85 ....4.60
Ind. Harbor, Ind. I-2, Y1..4.50
Johnstown, Pa. B2 ....4.50
Lackawanna, N.Y. B2 ...4.50
LoneStar, Tex. L6 ....4.85
Mansfield, O. E6 ....4.50
Minnequa, Colo. C10 ....5.35
Munhall, Pa. U5 ....4.50
Newport, Ky. N9 ....4.50
Pittsburgh J5 ....4.50
Riverdale, Ill. A1 ....4.50
Seattle B3 ....5.40
Sharon, Pa. S3 ....4.50
S. Chicago R2, U5, W14..4.50
SparrowsPoint, Md. B2 ..4.50
Steubenville, O. W10 ....4.50
Warren, O. R2 ....4.50
Weirton, W. Va. W6 ....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.
Fontana, Calif. K1 ....6.30
Geneva, Utah C11 ....5.65
Johnstown, Pa. B2 ....5.65
SparrowsPoint, Md. B2 ..5.65

PLATES, Wrought Iron
Economy, Pa. B14 ....10.40

PLATES, High-Strength Low-Alloy
Aliquippa, Pa. J5 ....6.725
Bessemer, Ala. T2 ....6.725
Clairton, Pa. U5 ....6.725
Cleveland J5, R2 ....6.725
Coatesville, Pa. L7 ....6.725
Conshohocken, Pa. A3 ..6.725
Ecorse, Mich. G5 ....6.825
Fairfield, Ala. T2 ....6.725
Fontana, Calif. (30) K1..7.375
Gary, Ind. U5 ....6.725
Geneva, Utah C11 ....6.725
Houston 85 ....6.825
Ind. Harbor, Ind. I-2, Y1..6.725
Johnstown, Pa. B2 ....6.725
LosAngeles B3 ....7.625
Munhall, Pa. U5 ....6.725
Pittsburgh J5 ....6.725
Seattle B3 ....7.625
Sharon, Pa. S3 ....6.725
S. Chicago, Ill. U5, W14..6.725
SparrowsPoint, Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy
Bridgeport, Conn. N19 ...6.55
Claymont, Del. C22 ....6.30
Coatesville, Pa. L7 ....6.30
Fontana, Calif. K1 ....6.95
Gary, Ind. U5 ....6.30
Houston 85 ....6.40
Ind. Harbor, Ind. Y1 ....6.30
Johnstown, Pa. B2 ....6.30
Munhall, Pa. U5 ....6.30
Newport, Ky. N9 ....6.30
Seattle B3 ....7.20
Sharon, Pa. S3 ....6.30
S. Chicago, Ill. U5, W14..6.30
SparrowsPoint, Md. B2 ..6.30
Youngstown Y1 ....6.30

FLOOR PLATES
Cleveland J5 ....5.575
Conshohocken, Pa. A3 ..5.575
Harrisburg, Pa. C5 ....5.575
Ind. Harbor, Ind. I-2 ....5.575
Munhall, Pa. U5 ....5.575
S. Chicago, Ill. U5 ....5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10...4.75
Ashland l.c.l (15) A10..5.25
Cleveland c.l. R2 ....5.10
Warren, O. c.l. R2 ....5.10

BARS

BARS, Hot-Rolled Carbon
Ala. City, Ala. R2 ....4.65
Aliquippa, Pa. J5 ....4.65
Alton, Ill. L1 ....4.85
Atlanta A11 ....4.85
Bessemer, Ala. T2 ....4.65
Birmingham C15 ....4.65
Bridgeport, Conn. N19 ..4.80
Buffalo R2 ....4.65
Canton, O. R2 ....4.75
Clairton, Pa. U5 ....4.65
Cleveland R2 ....4.65
Ecorse, Mich. G5 ....4.75
Emeryville, Calif. J7 ....5.40
Fairfield, Ala. T2 ....4.65
FairlessHills, Pa. U5 ..4.80
Fontana, Calif. K1 ....5.35
Gary, Ind. U5 ....4.65
Houston 85 ....4.90
Ind. Harbor, Ind. I-2, Y1..4.65
Johnstown, Pa. B2 ....4.65
Joliet, Ill. P22 ....4.65
KansasCity, Mo. 85 ....4.90
Lackawanna, N.Y. B2 ...4.65
LosAngeles B3 ....5.35
Massillon, O. R2 ....4.75
Midland, Pa. C18 ....4.65
Milton, Pa. M18 ....4.65
Minnequa, Colo. C10 ....5.10
Niles, Calif. P1 ....5.00
N. Tonawanda, N.Y. B11..4.65
Pittsburg, Calif. C11 ....5.35
Pittsburgh J5 ....4.65
Portland, Oreg. O4 ....5.40
Seattle B3, N14 ....5.40
S. Chicago R2, U5, W14..4.65
S. Duquesne, Pa. U5 ....4.65
S. SanFran., Calif. B3 ....5.40
Sterling, Ill. (1) N15 ....4.65
Sterling, Ill. N15 ....4.75
Struthers, O. Y1 ....4.65
Torrance, Calif. C11 ....5.35
Warren, O. R2 ....4.65
Weirton, W. Va. W6 ....4.65
Youngstown R2, U5 ...4.65

BARS, H.R. Leaded Alloy
Warren, O. C17 ....6.325

BARS, Hot-Rolled Alloy
Bethlehem, Pa. B2 ....5.575
Bridgeport, Conn. N19 ..5.725
Buffalo R2 ....5.575
Canton, O. R2, T7 ....5.575
Clairton, Pa. U5 ....5.575
Detroit R7 ....5.575
Ecorse, Mich. G5 ....5.675
Fontana, Calif. K1 ....6.625
FairlessHills, Pa. U5 ...5.725
Gary, Ind. U5 ....5.575
Houston 85 ....5.825
Ind. Harbor, Ind. I-2, Y1..5.575
Johnstown, Pa. B2 ....5.575
KansasCity, Mo. 85 ....5.825
Lackawanna, N.Y. B2 ...5.575
LosAngeles B3 ....6.625
Massillon, O. R2 ....5.575
Midland, Pa. C18 ....5.575
S. Chicago R2, U5, W14..5.575
S. Duquesne, Pa. U5 ....5.575
Struthers, O. Y1 ....5.575
Warren, O. C17 ....5.575
Youngstown U5 ....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa, Pa. J5 ....6.80
Bessemer, Ala. T2 ....6.80
Bethlehem, Pa. B2 ....6.80
Clairton, Pa. U5 ....6.80
Cleveland R2 ....6.80
Ecorse, Mich. G5 ....6.90
Fairfield, Ala. T2 ....6.80
Fontana, Calif. K1 ....7.50
Gary, Ind. U5 ....6.80
Houston 85 ....7.05
Ind. Harb., Ind. I-2, Y1 ..6.80
Johnstown, Pa. B2 ....6.80
KansasCity, Mo. 85 ....7.05
Lackawanna, N.Y. B2 ...6.80
LosAngeles B3 ....7.50
Pittsburgh J5 ....6.80
Seattle B3 ....7.55
S. Chicago W14 ....6.80
S. Duquesne, Pa. U5 ....6.80
S. SanFrancisco B3 ....7.55
Struthers, O. Y1 ....6.80
Warren, O. R2 ....6.80
Youngstown U5 ....6.80

BAR SIZE ANGLES; H.R. Carbon
Bethlehem, Pa. B2 ....4.80

BAR SIZE ANGLES; S. Shapes
Aliquippa, Pa. J5 ....4.65
Atlanta A11 ....4.85
Fontana, Calif. K1 ....5.35
Niles, Calif. P1 ....5.00
Pittsburgh J5 ....4.30
Portland, Oreg. O4 ....5.05
SanFrancisco B7 ....5.05

BAR SHAPES, Hot-Rolled Alloy
Clairton, Pa. U5 ....5.65
Gary, Ind. U5 ....5.65
Houston 85 ....5.90
KansasCity, Mo. 85 ....5.90
Youngstown U5 ....5.65

BARS, C.F. Leaded Alloy
Ambridge, Pa. W18 ...8.325
Camden, N.J. P13 ....8.50
Chicago W18 ....8.325
Cleveland C20 ....8.325
Monaca, Pa. B17 ....8.325
Newark, N.J. W18 ....8.50
SpringCity, Pa. K3 ....8.50
Warren, O. C17 ....8.325

BARS, Cold-finished Carbon
Ambridge, Pa. W18 ....5.90
BeaverFalls, Pa. M12, R2..5.90
Buffalo B5 ....5.95
Camden, N.J. P13 ....6.35
Carnegie, Pa. C12 ....5.90
Chicago W18 ....5.90
Cleveland A7, C20 ....5.90
Detroit R7 ....5.90
Detroit B5, P17 ....6.10
Donora, Pa. A7 ....5.90
Elyria, O. W8 ....5.90
FranklinPark, Ill. N5 ...5.90
Gary, Ind. R2 ....5.90
GreenBay, Wis. F7 ....5.90
Hammond, Ind. L2, M13..5.90
Hartford, Conn. R2 ....6.40
Harvey, Ill. B5 ....5.90
LosAngeles R2, S30 ....7.35
Mansfield, Mass. B5 ....6.45
Massillon, O. R2, R8 ....5.90
Midland, Pa. C18 ....5.90
Monaca, Pa. B17 ....5.90
Newark, N.J. W18 ....6.35
NewCastle, Pa. (17) B4 ..5.90
Pittsburgh J5 ....5.90
Plymouth, Mich. P5 ....6.15
Putnam, Conn. W18 ....6.45
Readville, Mass. C14 ....6.45
S. Chicago, Ill. W14 ....5.90
SpringCity, Pa. K3 ....6.35
Struthers, O. Y1 ....5.90
Waukegan, Ill. A7 ....5.90
Worcester, Mass. W19 ...6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland, Md. C19 ...5.15

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ....7.425
BeaverFalls, Pa. M12, R2 7.425
Bethlehem, Pa. B2 ....7.425
Buffalo B5 ....7.425
Camden, N.J. P13 ....7.60
Canton, O. T7 ....7.425
Carnegie, Pa. C12 ....7.425
Chicago W18 ....7.425
Cleveland A7, C20 ....7.425
Detroit R7 ....7.425
Detroit B5, P17 ....7.625
Donora, Pa. A7 ....7.425
Elyria, O. W8 ....7.425
Gary, Ind. R2 ....7.425
GreenBay, Wis. F7 ....7.425
Hammond, Ind. L2, M13..7.425
Hartford, Conn. R2 ....7.725
Harvey, Ill. B5 ....7.425
Lackawanna, N.Y. B2 ...7.425
LosAngeles S30 ....9.10
Mansfield, Mass. B5 ....7.725
Massillon, O. R2, R8 ....7.425
Midland, Pa. C18 ....7.425
Monaca, Pa. S17 ....7.425
Newark, N.J. W18 ....7.60
Plymouth, Mich. P5 ....7.625
S. Chicago W14 ....7.425
SpringCity, Pa. K3 ....7.60
Struthers, O. Y1 ....7.425
Warren, O. C17 ....7.425
Waukegan, Ill. A7 ....7.425
Worcester, Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)
Ala. City, Ala. R2 ....4.65
Atlanta A11 ....4.85
Birmingham C15 ....4.65
Buffalo R2 ....4.65
Cleveland R2 ....4.65
Ecorse, Mich. G5 ....4.75
Emeryville, Calif. J7 ....5.40
Fairfield, Ala. T2 ....4.65
FairlessHills, Pa. U5 ....4.80
Fontana, Calif. K1 ....5.35
Ft. Worth, Tex. (42) T4 ..5.10
Gary, Ind. U5 ....4.65
Houston 85 ....4.90

Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.10
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1..4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2..6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....5.90
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2 ..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.55
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..4.95
Franklin,Pa.(3) F5 ....4.55
Franklin,Pa.(4) F5 ....4.65
Marion,O.(3) P11 .....4.50
Moline,Ill.(3) R2 .....4.65
Tonawanda(3) B12 ....4.50
Tonawanda(4) B12 ....4.65
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 .....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1..4.325
Kokomo,Ind. C16 .....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. N12 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2.4.325
Steubenville O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Kokomo,Ind. C16 .....5.475
Niles,O. N12 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2.6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.875
Cleveland R2 .....4.925
Ind.Harbor,Ind. I-2 ...4.575
Warren,O. R2 .....4.925

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ...5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport Ky N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 .....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2 .7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.925
Middletown,O. A10 ....5.825
Warren,O. R2 .....5.925

SHEETS, Culvert (16 Gage)

	Cu Alloy	Cu Fe
Ashland,Ky A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry.O. W10 ....6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 ....5.85†
Canton,O. R2 .....5.85‡
Delphos,O. N16 .....6.60‡
Dover, O. R1 .....5.85‡
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 ....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity, Ill. G4 ...6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 ....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Niles,O. N12 .....6.85‡
Pittsburg,Calif. C1 ...6.60*
SparrowsPt.,Md. B2 ...5.85†
Steubenville,O. W10 ...5.85‡
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25
Niles,O. N12 .....7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Canton,O. R2 .....6.60
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Yorkville,O. W10 ....7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins,E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W.Co.
N16 New Delphos Mfg.Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Ailenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(25) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575
Warren,O. R2	4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland J5	6.45
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.45
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.45
Portsmouth,O. P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2 T5	6.25
Weirton, W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.45
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	....
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
New York W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.35

STRIP, Galvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.10*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$7.85
Gary,Ind. U5	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	6.25
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
WorcesterA7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.55
Roebling,N.J. R5	12.55
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. T6	12.85
Worcester,Mass. A7	12.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	9.75
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.55
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.55

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.43
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.13
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65
Coil No. 6500 Interm	
AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	11.05
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	179*
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 Ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga. J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166*
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166*

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.50
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,Mass W12	14.50	16.05*
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.80	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.075
Bartonville(48) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	
Crawfordsville M8	7.50	8.075
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla. M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	7.975*
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.35	8.75†
Portsmouth,O. P12	7.40	
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ling(1)(48)	N15 7.40	8.00††
Struthers,O.(48)	Y1 7.40	7.90‡
Worcester,Mass.	A7 7.70	

*Based on 12.50c zinc; †8c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	173
Atlanta A11	175
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth,Minn. A7	173
Fairfield,Ala. T2	173
Joliet,Ill. A7	173
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
S.Chicago R2	173
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	175
Sterling,Ill.(1) N15	173

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, less case lots, per cent off list, f.o.b. midwestern plants)

4" and shorter:	
½" & smaller diam.	+5
Over 4" through 6":	
½" and smaller diam.	+12
6" and shorter:	
⅝" and ¾"	+13
⅞" and larger	+16
Longer than 6":	
All diameters	+25
Lag bolts, all diams:	
6" and shorter	+2
Over 6" long	+11
Ribbed Necked Carriage	+13
Blank	2
Plow	18
Step, Elevator, Tap and Sleigh Shoe	2
Tire Bolts	12
Boiler & Fitting-Up Bolts	14

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	51
H.P., Hex. regular & heavy	
⅝" and smaller	55
¾" to 1¼", inclusive.	55
1⅜" to 1½", inclusive	57
1⅝" and larger	51
C.P. Hex regular & heavy:	
⅝" and smaller	55
Larger than ⅝"	51
Hot Galv. Nuts (all types):	
⅝" or smaller	38
¾" to 1¼", inclusive.	36
Finished Hex Nuts:	
⅝" and smaller	55
¾" and larger	51
Semifinished & Slotted Hex:	
Regular and heavy,	
⅝" and smaller	55
¾" and larger	51

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages; plain finish)

3" and shorter:	
#6 thru #8 diam, 25,000 to 200,000 pieces	61
Over 200,000 pieces	64
#10 thru ½" diam: 15,000 to 100,000 pieces	61
100,000 or more	64
Longer than 3", any diam: 5000 to 100,000 pieces	61
Over 100,000 pieces	64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under..List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.41
1¼	13	....	24.94	20.44
1½	13	23.31	27.57	22.60
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.59
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.54

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Toe Rails No. 2	Toe Rails All Under 60 lb
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.65
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	6.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity,Mo. S5	12.40
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R2	7.90

METAL POWDERS

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe, 16 mesh	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, frght. allowed	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.00-49.00†
Bronze, 5000-lb lots	58.00-61.50†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	53.25-60.00†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	18.25-32.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 30c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and heavier.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.30c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	...	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. P6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	23	+ 5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	23	+ 5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	....	....	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (12.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40 00	....	41.00	....	....	....
304	20.25	26.00	33.75	39 00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44 00	42 25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52 00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	78 25	78.75	78.75
314	....	....	....	....	....	....	78.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	....	26.00	30.00	....	31.00	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31 00	32.25	36.75	36.75
430F	....	....	28.50	30.50	....	31.50	....	....	....
431	16.00	20.50	28.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co., American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.05	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled, 10%	Strip, Carbon Base, Cold Rolled, Both Sides
Copper*	26.60	33.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S15.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.345
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.250
1.5	4	1	....	8.5	0.960

Tool steel producers include; A4, A5, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Alabama City, Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward, Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda, N.Y. W12	58.50	59.00	59.50	60.00
N. Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester, N.Y. deld.	61.52	62.02	62.52	....
Syracuse, N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary, Ind. U5	58.50	....	59.00	....
S. Chicago R2	58.50	....	59.00	....
S. Chicago, Ill. Y1	58.50	59.00	59.00	59.50
S. Chicago, Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon, Mich., deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron, O., deld.	61.25	61.75	61.75	62.25
Lorain, O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem, Pa. B2	60.50	61.00	61.50	62.00
New York, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro, Pa. B10	60.50	61.00	61.50	62.00
Chester, Pa. C31	54.50	55.00	55.50	....
Philadelphia, deld.	56.16	56.66	57.16	....
Steelton, Pa. B2	60.50	61.00	61.50	62.00
Swedeland, Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy, N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island, Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKees Rocks, deld.	....	60.04	60.04	60.54
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer, Pa. U5	58.50	....	59.00	59.50
Clairton, Rankin, S. Duquesne, Pa. U5	58.50	....	....	....
McKeesport, Pa. N3	58.50	....	....	59.50
Midland, Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard, O. Y1	....	....	59.00	....
Sharpsville, Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield, O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie, Pa. I-3	58.50	59.00	59.00	59.50
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	64.50	65.00	....	....
Geneva, Utah C11	58.50	59.00	....	....
Granite City, Ill. G4	60.40	60.90	61.40	....
Ironton, Utah C11	58.50	59.00	....	....
Lone Star, Texas L6	....	55.00*	....	....
Minnequa, Colo. C10	60.50	61.00	61.50	....
Rockwood, Tenn. T3	....	55.00‡	59.00	....
Toledo, O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75; $56. Phos. 0.31-0.50.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 18%; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, (Open-hearth & Fdry, freight allowed K2)	87.50
Keokuk, O.H. & Fdry. 12½ lb piglets, 16% Si, frgt allowed K2	90.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035 max.)	$72.50
Steelton, Pa. B2 (Phos. 0.035 max.)	66.50
Philadelphia, deld.	70.05
Troy N.Y. R2 (Phos. 0.035 max.)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.¶	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	9.10	....	7.65	...	7.61	8.62[3]	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	46.55	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.06	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	....	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.28	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	47.67	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	11.80	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[3]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; ‡‡under ¼-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—100 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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Boston	Dallas	Indianapolis	Minneapolis	Pittsburgh	Seattle
Charlotte†	Denver	Kansas City, Mo.	Newark	Providence	Waterbury

Stainless steel producers are handicapped as . . .

Nickel Scrap Tightens

NICKEL-BEARING steel scrap is the key to a record year for stainless steel producers (see below).

With nickel in short supply, stainless scrap prices are soaring. For 18-8 sheets, clips and solids, brokers are paying $280 to $285 per ton; borings and turnings are bringing $135 to $140. The wide differential in price is due to the greater contamination (oil, etc.) found in borings and turnings which increases melt loss. Straight chromium grades of stainless scrap are in fairly good supply, selling at $100 to $120 per ton.

Mathematics—Using $280 per ton as a base, an 80,000-lb carload of 18-8 scrap represents a minimum value of $11,200 (about 14 cents a lb). One ton of 18-8 grade scrap contains 160-lb of nickel, and with this metal at 64.5 cents a lb, the scrap buyer is getting $103.20 worth of nickel per ton of 18-8 scrap.

While the current supply of nickel-bearing stainless scrap is about 8000 tons a month, some 12,000 tons are needed to meet industrial demands. Producers of stainless are becoming so scrap minded that they are selling nickel-bearing grades and finished steel with a proviso that the scrap generated be returned. This keeps considerable tonnage off the market. Roughly 46 per cent of nickel-bearing scrap is home material; the rest must be bought on the open market.

Scrap Charge—In producing an 18-8 grade of nickel-bearing stainless ingots, the average charge of new nickel is 82 lb. Under present conditions, scrap charges are running from 70 to 75 per cent, where possible. The usual scrap charge is 35 to 40 per cent. This substanial increase in the use of scrap is also contributing to the scarcity.

Of 590,921 tons of stainless ingots poured during the first six months of this year, 324,780 tons included nickel-bearing specifications. The average ratio is about 56 per cent nickel, compared with 44 per cent straight chromium. Stainless producers are revising specifications so that grades will take less nickel and more manganese, (STEEL, Sept. 5, p. 133), but the current ratio will be maintained during the remainder of this year. This will mean that some 670,000 ingot tons of nickel-bearing grades will be poured.

Nickel Needs—An estimated 85,000 tons of new nickel could be consumed if it were available. Furnaces are not even coming close to this rate. Despite recent releases of 500 and 750 tons of nickel per month from government stockpiles, over-all requirements will not be met.

During the first six months of this year, stainless production consumed slightly under 14,000 tons of nickel. Other steels used 8665 tons, and cast iron took an additional 1600 tons. Industry requirements for new nickel are nearing a peak of some 20,000 tons per month.

Outlook: Stainless steel will register a peak year, if nickel-bearing steel scrap supplies can hold up during the last quarter of this year.

Stainless Steel Production

(All grades and heat resisting)

	Ingots & Castings (in tons)	Finished Steel Shipments (in tons)
1955*	1,200,000	660,000
1954	852,021	452,351
1953	1,049,077	601,708
1952	930,164	509,703
1951	933,730	539,510
1950	832,309	449,380

Source: American Iron & Steel Institute
*Estimated STEEL

Sheets, Strip . . .

Sheet & Strip Prices, Pages 155 & 156

The only possibility that sheet supply may loosen up in the fourth quarter is pegged to the chance that tin plate demand may decline after Oct. 1, when prices go up, making it possible for integrated producers to divert ingots from tin plate to sheet production.

No decline in new orders is noted. Cancellations are under average, and hot-rolled sheets appear almost as difficult to obtain for the fourth quarter as cold-rolled.

Producers generally are sold out for the remainder of the year on all major sheet items. While one Pittsburgh mill is reported committed through first quarter of next year, generally, producers have not formally opened books for shipment beyond year end, except for stainless, alloys and other specialties—nor are there any indications they will soon. Due to arrearages, however, sizable tonnage booked originally for fourth quarter delivery will not be shipped until after the turn of the year.

Cold-rolled sheets continue to head the list of tight supply products in the Chicago market. Little change in conditions is indicated for the months immediately ahead, with automakers getting set for new model production. During the model changeover period they have pressed for all the tonnage the mills could ship them.

Orders are diminishing for the first time in months at St. Louis, but only because far extended delivery promises discourage customers in their efforts to place new tonnage on mill books.

Tubular Goods . . .

Tubular Goods Prices, Page 158

Sales are lagging in seamless pressure tubing and line pipe, but producers say demand for both items may rise rapidly before next year's construction season starts.

Meanwhile, most producers of tubular goods are forced to delay shipment of some orders in working out a uniform flow of production. For example, one Pittsburgh mill's order books for mechanical tubing are filled through January. Pipemakers hope to speed up deliveries so that they will be on schedule by early next year.

Auto builders are ordering more

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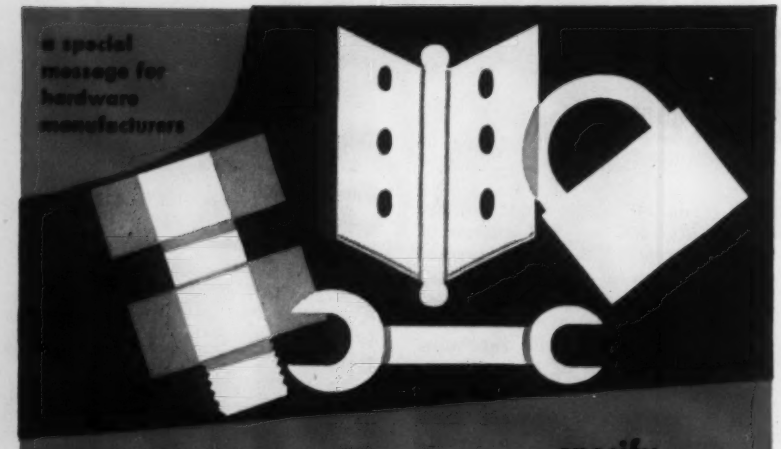

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seamless mechanical tubing, with the trend to automatic transmissions in autos increasing requirements.

Steel Bars . . .

Bar Prices, Page 154

While producers have virtually no tonnage to offer for shipment this year in the hot-rolled grades, they still can take new orders for hot alloy bars for late October and November delivery. Cold finishers can give about six-to-eight-week shipment where mill stock is available. This applies to carbon and alloy. Some processed material is on hand, notably in the East, which enables prompt shipments, but the amount is relatively small.

At Chicago, hot-rolled bar deliveries are running about a month late, but this varies according to sizes, due to lengthened rolling cycles. However, in sizing up demand, some barmakers figure this might be one product which could end the year without much carry-over. Seasonal influences figure in this. A good omen for bars is that farm equipment makers envision a 10 to 15 per cent improvement in their 1956 business.

Consumers will get about as much tonnage in the fourth quarter as they are receiving in the current 3-month period. A portion of the tonnage received, however, will represent steel due them prior to the fourth quarter. In some cases producers have had to cut back on orders accepted. They will have some carry-over going into the first quarter next year, though, despite current efforts to avoid overselling. Consumers are not cutting back orders. In fact, automotive requirements are reported increasing.

Tin Plate . . .

Tin Plate Prices, Page 156

Prospects for fourth quarter tin plate business are beginning to clarify. Producers say sales will be better than they had anticipated after announcing a price increase, effective Oct. 1. Volume will be below that of third quarter, but the drop in buying will be gradual. Steelmakers will welcome the opportunity to divert ingots to other products.

U. S. Steel Corp. has issued a revised extra card on holloware enameling black plate (29 to 31 gage inclusive). The revised card becomes effective Oct. 1 and supersedes the card dated Oct. 1, 1954. Changes apply to width differentials, length, resquaring and quantity extras.

Consumption of tin plate is diffi-

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cult to gage because canmakers are pressing for all the tonnage producers can ship during the remainder of this month to beat the Oct. 1 price increase. It has been a good year for the food pack and packaging of soft beverages.

Record August Steel Output

August production of steel was the highest for that month on record, reports the American Iron & Steel Institute. Output totaled 9,583,000 net tons, more than 177,000 tons above the 9,405,580 tons produced in August, 1953, when the previous record for that month was set. Last year, 6,666,907 tons were poured by the furnaces during the month.

In the first eight months of 1955, the production total was 75,890,248 net tons, only slightly under the record eight-month figure of 76,627,189 set in 1953. Production in the first eight months of 1954 totaled 57,426,136 tons.

The index of steel production in August rose to 134.7, compared with a revised figure of 127.9 for July and 93.7 for August a year ago. The index for the first eight months this year was 136.1.

Production during August was at 89.6 per cent of capacity, rated at 125,828,310 net tons at the beginning of the year. Output for the first eight months was at 90.6 per cent of capacity. In 1954, when capacity was rated at 124.3 million tons, August production was at the rate of 63.1 per cent.

Shipments of Steel Products—July, 1955

(All Grades; Net Tons)

Products	Carbon	Alloy	Stainless	Seven Months 1955	Seven Months 1954
Ingots	35,946	12,311	1,228	328,141	206,472
Blooms, etc.	170,562	42,023	1,477	1,620,401	850,899
Skelp	13,461	.....	.....	98,888	68,340
Wire rods	78,975	1,080	640	658,050	441,780
Total semifinished	298,944	55,414	3,345	2,705,480	1,567,491
Structurals	353,702	3,032	.....	2,627,853	2,806,925
Steel piling	31,625	.....	.....	214,167	224,642
Plates	479,482	24,282	2,041	3,676,462	3,332,724
Rails—standard	99,438	.....	.....	750,219	861,030
Rails—all other	4,715	.....	.....	42,024	53,799
Joint bars	7,676	.....	.....	42,221	52,648
Tie plates	30,116	.....	.....	198,758	184,055
Track spikes	7,807	.....	.....	58,117	49,185
Wheels	21,763	12	.....	166,842	121,274
Axles	8,215	7	.....	61,962	36,494
Total railroad	179,730	19	.....	1,320,143	1,358,485
Bars—hot rolled	473,213	150,536	2,812	4,936,694	3,612,794
Bars—reinforcing	177,158	.....	.....	1,190,777	1,035,046
Bars—cold drawn	99,893	18,758	3,417	1,050,223	692,542
Tool steel	797	6,707	.....	64,645	50,190
Total bars	751,061	176,001	6,229	7,242,339	5,390,572
Standard pipe	245,145	34	.....	1,676,877	1,327,799
Oil country goods	158,545	34,618	.....	1,431,725	1,420,515
Line pipe	295,756	.....	.....	1,671,033	1,712,074
Mechanical tubing	51,989	16,879	405	538,443	400,556
Pressure tubing	17,804	1,783	1,276	151,674	171,528
Total pipe	769,239	53,314	1,681	5,469,752	5,032,472
Wire—drawn	198,514	2,920	1,926	1,808,193	1,372,142
Nails & staples	48,607	.....	.....	409,021	334,810
Barbed wire	5,579	.....	.....	90,915	96,697
Woven fence	17,465	.....	.....	227,567	209,792
Bale ties	7,594	.....	.....	44,854	38,738
Total wire	277,759	2,920	1,926	2,580,550	2,052,179
Black plate	49,412	.....	.....	463,178	402,093
Tin plate H-D	76,473	.....	.....	687,998	825,930
Tin plate—electro	291,405	.....	.....	2,837,432	2,436,090
Total tin plate	417,290	.....	.....	3,988,608	3,664,113
Sheets HR	674,213	25,590	2,709	5,377,223	3,451,870
Sheets CR	1,087,733	4,941	11,439	8,560,295	5,443,871
Sheets—galvanized	205,211	.....	.....	1,576,272	1,335,505
Sheets—other coated	20,930	.....	.....	152,391	100,057
Sheets—enameling	16,290	.....	.....	122,007	98,270
Sheets—electrical	7,267	51,182	.....	447,765	349,168
Strip HR	142,419	2,138	436	1,213,169	835,522
Strip CR	89,558	911	18,594	966,280	720,843
Total sheets	2,243,621	84,762	33,178	18,415,402	12,335,106
Total shipments	5,802,453	399,744	48,400	48,240,756	37,764,709

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)	Number of weeks in month
1955														
January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974	4.43
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233	4.00
March	9,060,026	96.7	141.4	255,493	62.8	72.7	666,235	72.6	186.5	9,981,754	93.4	140.3	2,253,281	4.43
1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139	12.86
April	8,858,549	97.7	142.9	275,069	69.8	80.9	681,477	76.6	197.2	9,815,095	94.8	142.6	2,287,901	4.29
May	9,307,291	99.4	145.3	305,347	75.1	86.9	715,678	77.9	200.4	10,328,316	96.6	145.2	2,331,448	4.43
June	*8,764,430	96.6	141.4	283,544	72.0	83.4	*698,493	78.6	202.1	9,746,467	94.1	141.6	2,271,904	4.29
2nd Quarter	*26,930,270	97.9	143.2	863,960	72.3	83.8	*2,095,648	77.7	199.9	29,889,878	95.2	143.1	2,297,454	13.01
1st 6 Months	*51,779,525	94.7	138.5	1,515,773	63.8	73.9	*3,911,004	72.9	187.5	57,206,302	91.6	137.7	2,211,299	25.87
*July	8,232,535	88.1	128.5	268,348	66.1	76.4	600,063	65.5	168.0	9,100,946	85.3	127.9	2,059,038	4.42
†August	8,596,000	91.8	134.2	299,000	73.5	85.1	688,000	74.9	192.6	9,583,000	89.6	134.7	2,163,000	4.43
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Quarter	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
May	6,817,951	73.6	106.4	198,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
June	6,702,006	74.7	108.1	207,666	52.7	61.1	453,962	52.8	131.3	7,363,634	72.0	107.0	1,716,465	4.29
2nd Quarter	19,885,283	73.1	105.8	568,386	47.6	55.1	1,353,640	51.9	129.1	21,807,309	70.3	104.4	1,676,196	13.01
1st Half	40,314,689	74.5	107.8	1,210,818	51.0	59.0	2,606,125	50.3	125.0	44,131,632	71.5	106.2	1,705,900	25.87
July	6,040,120	65.3	94.3	205,313	50.6	58.4	382,164	43.1	107.0	6,627,597	62.9	93.2	1,499,456	4.42
August	6,021,496	65.0	94.0	217,837	53.6	62.0	427,574	48.2	119.7	6,666,907	63.1	93.7	1,504,945	4.43
September	6,140,266	68.6	99.1	214,065	54.5	63.0	453,152	52.8	131.1	6,807,483	66.7	98.9	1,590,533	4.28
3rd Quarter	18,201,882	66.3	95.8	637,215	52.9	61.1	1,262,890	48.0	119.1	20,101,987	64.2	95.2	1,530,997	13.13
9 Months	58,516,571	71.7	103.7	1,848,033	51.6	59.7	3,869,015	49.5	123.0	64,233,619	69.1	102.5	1,647,016	39.00
October	6,973,568	75.2	108.9	237,754	58.5	67.7	490,211	55.2	137.3	7,701,533	72.9	108.3	1,738,495	4.43
November	7,307,151	81.4	117.9	231,191	58.7	68.0	551,085	64.1	159.4	8,089,427	79.1	117.5	1,885,647	4.29
December	7,530,204	81.4	117.6	231,126	57.0	65.8	525,743	59.4	147.2	8,287,073	78.6	116.5	1,874,903	4.42
4th Quarter	21,810,923	79.3	114.7	700,071	58.0	67.1	1,567,039	59.5	147.8	24,078,033	76.8	114.0	1,832,423	13.14
2nd Half	40,012,805	72.8	105.2	1,337,286	55.4	64.1	2,529,929	53.8	133.5	44,180,020	70.5	104.6	1,681,767	26.27
Total	80,327,494	73.6	106.5	2,548,104	53.2	61.6	5,436,054	52.0	129.3	88,311,652	71.0	105.4	1,693,741	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.
Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,580 net tons, total 124,330,410 net tons.
*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

Ferroalloys . . .

Ferroalloy Prices, Page 166

Prices on ferroalloys last week were increased an average of 5.3 per cent by the Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York. Other producers are expected to take similar action. The increases become effective Oct. 1 on contracts and immediately on a spot basis.

Fluorspar . . .

Demand for imported fluorspar is reported sluggish. European spar is quoted at $34 net ton, f.o.b. cars, duty paid. Prices on Mexican spar are unchanged at $25.50. The quoted prices apply only at point of entry, freight beyond being charged to buyer's account.

Structural Shapes . . .

Structural Shape Prices, Page 154

Operations of most structural fabricators are limited by their ability to obtain steel. Because of the shortage of both structural shapes and plates, some shops in the East can operate no better than four days a week. Substantial tonnage is being placed with warehouses.

Emergency demands on the mills resulting from recent floods in New England and the East, are contributing materially to the supply stringency. Priority service is being given stricken communities. For example, eight days after fabrication began, a job that normally would take months was completed by American Bridge Division, U. S. Steel Corp., when it shipped two 109-ft girders from its Ambridge, Pa. plant to replace a washed-out span on the Erie railroad at Shohola, Pa.

But even before the flood disaster, shape supply was critical, with most mills oversold. They were compelled to restrict new commitments so long as they lag behind on old ones. Some shops apparently overreached themselves in taking on new work. Some firms took on heavier tonnage work than before.

Contracts for power plant extensions and an increasing volume of bridge estimates mark current structural steel activity in New England. About 5000 tons have been placed for power plants by a Boston utility engineering firm, and additional tonnage for such work is on boards. Bids have been postponed on 4630 tons for Connecticut bridges to Sept. 26.

Year end carry-overs will be substantial, little relief being in sight before first quarter next year. Some new shape capacity, however, should become available late this fall. What relief this will provide is uncertain.

Plates . .

Plate Prices, Page 154

Resumption of operations at the larger of two mills at Claymont, Del., last week following a several week suspension for repairs, will ease plate supply to some extent. Indications are, however, demand will run well ahead of supply over remainder of this year.

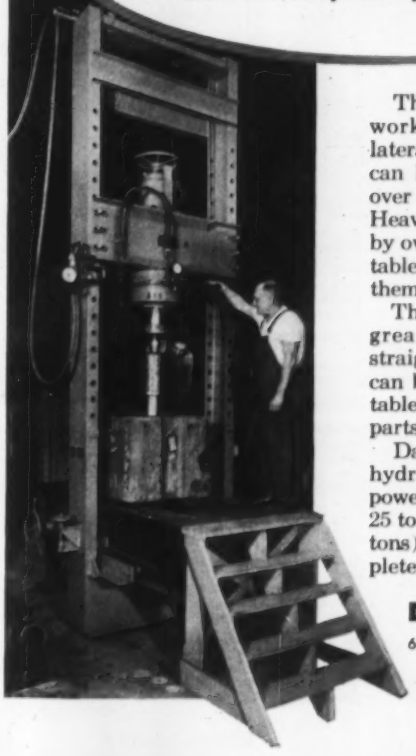
Taking arrearages into account, some mills are sold out for the fourth quarter, and those which are not, could be if they cared to open their books for the entire period. Delay in opening books for the entire quarter, except possibly for one premium price mill, is due to a special effort to get order books in better balance.

Plates stack up just behind cold-rolled sheets as the tightest of all products in the Chicago market. Fabricators are booked for months ahead

(*Please turn to page* 168)

Designed for awkward, heavy hard-to-handle pressing jobs

With this Dake Movable Frame Press you can move tons of hydraulic power over your work.



The frame moves lengthwise over the worktable, and the workhead moves laterally along the frame. Thus the ram can be placed anywhere it is needed over the extremely large work area. Heavy, awkward parts can be moved by overhead crane or hoist to the worktable, and the power centered above them.

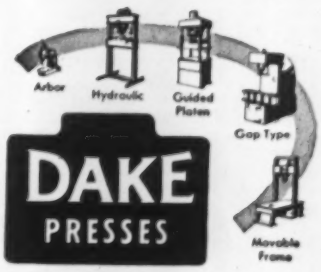
The extra large table area gives a greater capacity for bending and straightening work, too. Support points can be spread to extreme edges of the table for long or irregularly-shaped parts.

Dake Movable Frame Presses are hydraulically operated, and may be powered either by air (in capacities of 25 to 150 tons) or electricity (25 to 300 tons). Write for Bulletin 269B for complete description and specifications.

DAKE CORPORATION

640 Seventh St., Grand Haven, Mich.

Pressing the battering point into the hammer of a pile driver with a Dake Movable Frame Press.



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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $66, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $54 per ton, Palmerton, Pa.; $86 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.90c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max. 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.00c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.60c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.30c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, C 0.025% max. (Simplex 30.00c per lb contained Cr, 0.03 C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed S M x D, 18.35c per lb of alloy, ton lot 19.2c; less ton lot, 20.4c, delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.06% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 23.50c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.40c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10% carbon grades, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primes and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11c per lb of contained Si, carload packed 12.6c, ton lot 13.5c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 15.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.25c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.60c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered, Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet. Packed c.l. 7.15c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67, delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.80-$6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min. C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, deld.; less ton lots $4.70.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5.7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal, Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c. 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Bigio, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.26 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa. $1.24.

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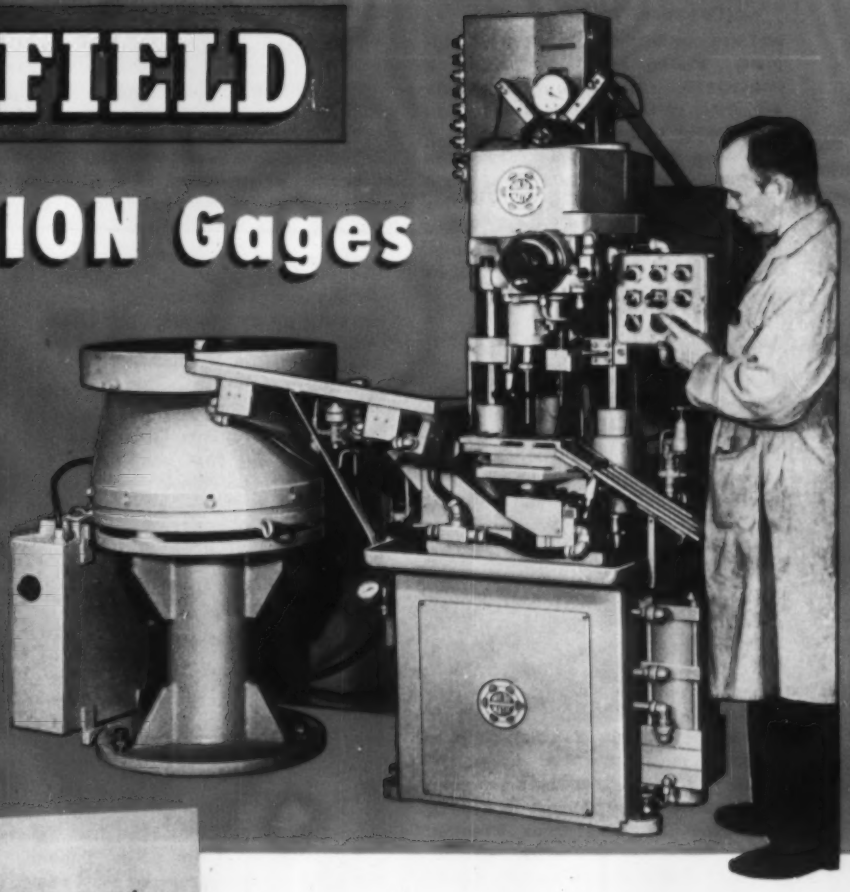
AUTOMATION Gages

Assure Fast Accurate Machining



Sheffield Automation Gages are package units, ready-to-use and economically priced, for the control of grinding, boring, drilling, honing, milling, turning and other machining operations.

Mounted on machine tools, they measure work part dimensions and space relationships and instantly translate this information into impulses which in turn:

- Energize signal lights
- Actuate solenoid ejection or classification mechanisms
- Start and stop the machine tool
- Provide feed-back control
- Control cutting tool or grinding wheel positioning and compensation, also time cycle.
- Provide visual dimensional readings

A Typical Application

Here the bore of transmission pinions is being honed on a Micromatic Model 738 Machine and gaged automatically.

If the actual bore size, after honing, is within .0001" of either tolerance limit, white warning lights flash on.

If either tolerance is exceeded, a red or green signal flashes and the faulty part is automatically ejected.

When a predetermined number of rejects pass through in succession the machine is automatically stopped.

The actual size of each bore, as it is gaged can be read on a conveniently located air gage dial or column as built into the machine tool pneumatic circuit.

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(*Concluded from page* 165)

and are operating on scant steel supplies. Platemakers have about a one-month carry-over. Prospects are, little of that can be absorbed in the closing quarter of the year.

In New England, plate fabricators are maintaining operations, in some cases getting plates against overdue orders in the quantity needed. Prices on fabricated plate products, tanks, weldments, heads and flanged shapes are firmer in the area.

Wire . . .

Wire Prices, Pages 156 & 157

Indications are wire supply will be tighter in the closing quarter. Noticeable increase in bookings is reported at all market centers. Flood repairs in New England and the East are drawing some wire from Cleveland and other midwest production points.

Demand for medium and heavier grades of wire in New England is strong. Fourth quarter schedules in the area are nearly filled on more items, notably spring and heading grades. Some eastern consumers of specialties will run short of supplies because of production losses at Worcester, Mass. On the more common grades some tonnage is coming into New England from Trenton, N. J., and Cleveland mills. On numerous specialties, however, transfer of tonnage from Worcester, Mass., is impractical and in the end would not improve deliveries.

Wire bookings through the remainder of the year are much heavier in the East, extending to a broader range of finished items on which lead time is stretching out. Producers are making shipments close to schedule, however, and carry-over tonnage will not be so large as in other carbon steel products.

Mill schedules are reported filled into December on manufacturers bright wire, cold-heading stock and spring grades. Backlogs on highway accessories also are heavy and prompt shipments for flood repairs are depleting warehouse stocks. Rope demand is stronger.

Warehouse . . .

Warehouse Prices, Page 159

Major concern of distributors is their inventories. Some warehousemen say they could be doing 50 per cent more business if they had larger and better balanced stocks. Imbalance is most pronounced in construction and flat-rolled products and plates where demand is heaviest. Pressure on distributors for tonnage continues strong.

Mills are still lagging on shipments of practically all items.

A favorable aspect of the market for distributors is that prices have strengthened and scattered price cutting has been eliminated.

The recent floods in the Northeast virtually halted shipments from that area to the West Coast, causing a tightening in supplies. One Seattle distributor has purchased a limited quantity of structurals from Luxemburg fabricators to replenish stocks. European steel can be delivered on the West Coast at slightly less than domestic price levels, but foreign producers are well booked ahead and refuse to commit themselves for large tonnages. Items produced by West Coast mills are available in 45 to 60 days. Wide flange sections are on strict allocation.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 157

Prices on standard plate washers are up $5 a ton. Quantities up to 5000 lb are quoted list plus 25 cents per 100 lb; 5000 to 20,000 lb, list.

Pig Iron . . .

Pig Iron Prices, Page 159

Although far from brisk, demand for foundry pig iron is increasing moderately from the lows registered a month ago when foundry operations were retarded by vacations and unusually hot weather. The trend is upward, and producers believe it will extend through October and possibly beyond.

Buyers continue to purchase hand to mouth. Demand has been stimulated by requirements of the automotive industry which is swinging swiftly into new model production.

Iron Ore . . .

Shipments of Lake Superior iron ore totaled 3,071,173 gross tons in the week ended Sept. 12, reports the Lake Superior Iron Ore Association. This compares with 1,921,357 tons moved in the like week a year ago. It brought the movement for the 1955 shipping season to 59,800,753 tons against 45,812,353 in the corresponding period of 1954.

Expectations are the total movement for the 1955 season will exceed 80 million gross tons. At the opening of lake shipping this year vessel operators expected the season movement would not exceed 75 million tons. The record season movement was in 1953, when nearly 96 million gross tons were brought down from the head of the lakes.

Metallurgical Coke . . .

An extensive coke plant modernization program is being pushed at the Lorain Works of the National Tube Division, U. S. Steel Corp. Operation of a newly completed battery of 59 Koppers ovens started Sept. 7. Early in July a new battery of 59 Wilputte ovens went into full-scale production. Work will begin shortly on installation of still another battery. The newest battery of ovens will consume 1083 tons of coal daily in producing 760 tons of coke.

Semifinished Steel . . .

Semifinished Prices, Page 154

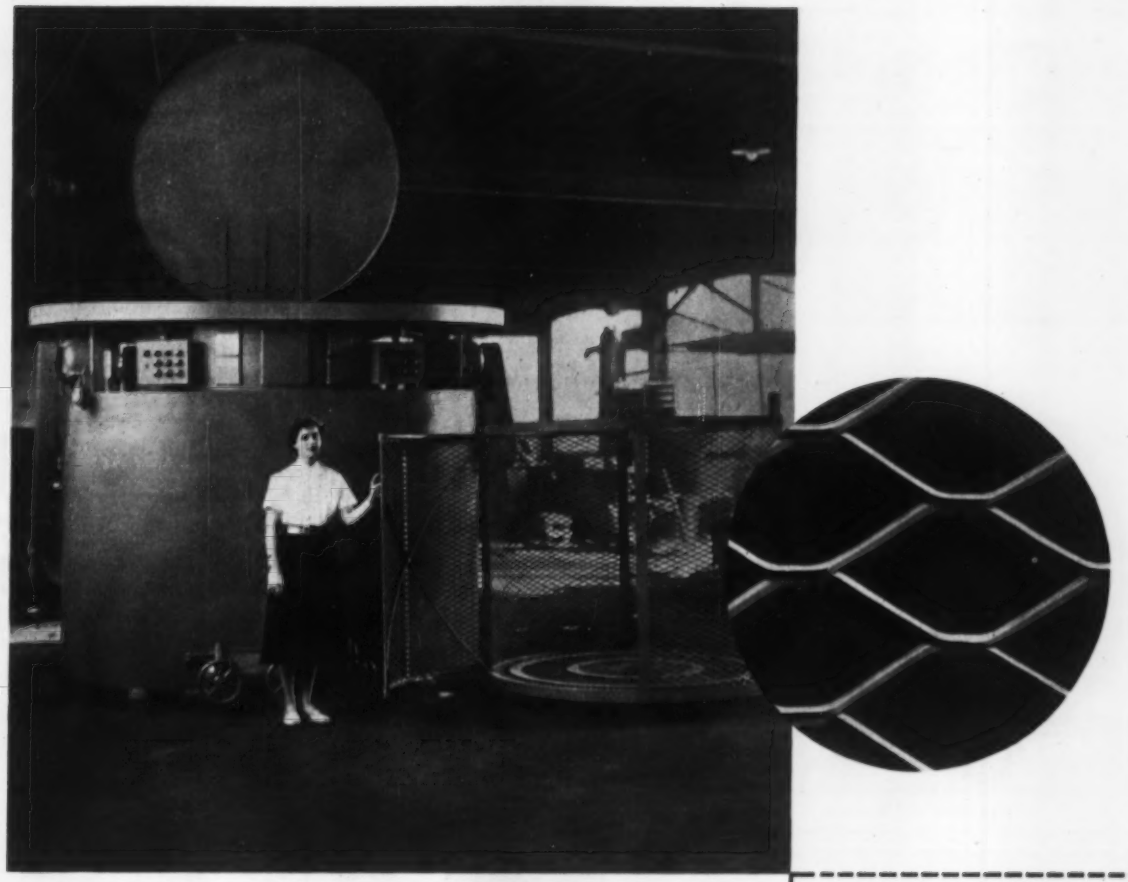
Operations will not start at the new electric furnace of Atlantic Steel Co., Atlanta, Ga., until Oct. 15. The original starting date was Sept. 15. Postponement was due to delays in receiving parts from a strikebound Pittsburgh plant. When the new electric is ready for operation, the company plans to reduce its open-hearth production by about the amount of increased electric steel output.

More Metal Cans Are Shipped

Metal can shipments spurted in July to 427,434 tons, compared with 397,799 in June and 405,150 in July a year ago, reports the Census Bureau. Total shipments in the first seven months this year were 2,376,401 tons, against 2,244,375 in the like period last year.

The movement of cans for fruits and vegetables (including juice) in the first seven months this year was 651,206 tons. This compares with 587,414 in the like period of 1954. Beer can shipments amounted to 432,862 tons against 396,304; evaporated and condensed milk can shipments, 152,926 tons against 149,321; and coffee can shipments, 104,737 tons against 106,404.

Shipments of steel barrels and drums in July amounted to 3,017,264 units, bringing the total for the first seven months of this year to 20,808,898. In the corresponding period of last year, shipments totaled 19,111,483 units. Deliveries of steel shipping packages, kegs and pails in July amounted to 6,854,348 units, which brought the total for the first seven months to 44,820,829, compared with 41,674,917 in the corresponding period of 1954.



How jet engines take a bath in an expanded metal basket

The J. P. "Whirlpool" industrial cleaner, shown above, cleans jet engines and parts at an Air Force base. Made by J. P. Manufacturing Co., of Youngstown, Ohio, the cleaner has an expanded metal basket with a two-ton capacity. A propeller and whirlpool circulate cleaning solution through the basket's mesh, searing off all deposits on metals being cleaned.

Penmetal expanded metal was ideal material from which to form the basket. Strong enough to take a two-ton load, yet with an open mesh, which permits free-circulation of the solution. It's low in cost, too.

Penmetal expanded metal is easily formed, shaped and welded. Comes in corrosion-resistant metals and carbon steel; large or small mesh; light or heavy gauge.

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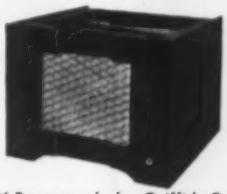
Barbeque grill by Chattanooga Royal Company, Chattanooga, Tenn. Shelf is expanded metal.



TV Base, made by Griffith Co., Parkersburg, West Virginia. Front decoration of expanded metal.

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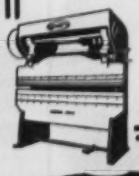

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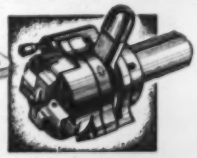

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Scrap . . .

Scrap Prices, Page 172

Pittsburgh—Absence of major purchases recently makes the price of No. 1 heavy melting scrap largely nominal. Mills appear to be waiting for lower prices in the fourth quarter. They are expected to re-enter the market soon.

Price increases in cast iron grades are traced to improved foundry activity in this area. Railroad specialties are quoted $1 a ton over last week's prices.

Cleveland—The undertone of the scrap market here and in the Valley contniues strong, but except for an advance of 50 cents per ton on blast furnace grades, prices are unchanged. The blast furnace advance reflected a substantial purchase by a northern Ohio mill. Purchase of substantial electric furnace tonnage by a Valley mill last week confirmed the quoted market on that grade.

Boston—Steel scrap prices generally are unchanged here. The bulk of market activity is in shipments against old orders. New buying by district consumers is slack. Cast iron grades are moving slowly, with prices barely holding.

New York—Scrap brokers have advanced buying prices on No. 1 cupola to $34.50 and on unstripped motor blocks and heavy breakable to $25-$26, and $38-$39, respectively. Offerings on all other grades are firm.

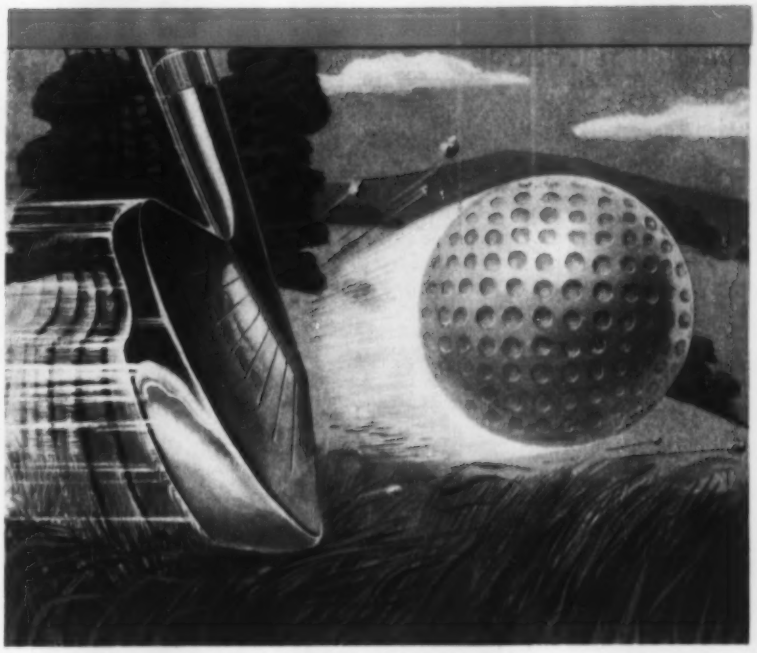
Buffalo—Prices on both steel and cast iron grades of scrap dropped $1 a ton here last week on substantial sales to a leading area consumer.

Philadelphia—The scrap market is strong in this area, especially railroad specialties and the cast iron grades. No. 1 cupola cast is higher at $39-$40, delivered. Malleable, in which the situation is either a feast or a famine, suddenly has become scarce, with demand strong and prices up sharply to $57-$58, delivered. Drop broken machinery is higher at $47-$48. Only heavy breakable is unchanged. In the rail specialties, crops, 2-ft and under, have jumped $4 a ton to $58, delivered, while couplers, springs and wheels are up $1 to $51. All other steel grades are unchanged but strong.

Cincinnati—Purchases by the local mill boosted scrap prices here, reversing the downtrend previously in evidence. It appears dealers will be able to move all their normal accumulations this month.

Chicago—The stronger tone in scrap has netted advances of $1 a ton in the leading grades of industrial

(*Please turn to page* 174)



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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 14	$44.33
Sept. 7	44.00
Aug. Avg.	43.97
Sept. 1954	29.94
Sept. 1950	40.93

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	43.00-44.00
No. 2 bundles	35.00-36.00
No. 1 busheling	43.00-44.00
Machine shop turnings	28.00-29.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	32.00-33.00
Cast iron borings	32.00-33.00
Cut structurals, 3 ft lengths	48.00-49.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	48.00-49.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	*38.00-39.00*
Heavy breakable cast	*38.00-39.00*
Unstripped motor blocks	29.00-30.00
No. 1 machinery cast	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	51.00-52.00
Railroad specialties	*53.00-54.00*

Stainless Steel Scrap

18-8 bundles & solids	265.00-275.00
18-8 turnings	120.00-130.00
430 bundles & solids	100.00-105.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	43.50-44.50
No. 2 heavy melting	32.00-33.00
No. 1 bundles	43.50-44.50
No. 2 bundles	29.00-30.00
No. 1 busheling	43.50-44.50
Machine shop turnings	23.00-24.00
Mixed borings, turnings	*27.50-28.50*
Short shovel turnings	*27.50-28.50*
Cast iron borings	*27.50-28.50*
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	47.00-48.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	43.50-44.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	51.00-52.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	50.00-51.00
Cast steel	46.00-47.00
Railroad specialties	52.00-53.00
Uncut tires	47.00-48.00
Angles, splice bars	53.50-54.50
Rails, rerolling	60.00-61.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	275.00-280.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	46.00-47.00
No. 2 bundles	32.00-33.00
No. 1 busheling	46.00-47.00
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	46.00-47.00
Electric furnace bundles	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

CHICAGO

No. 1 heavy melting	*42.00-44.00*
No. 2 heavy melting	34.00-35.00
No. 1 factory bundles	*44.00-45.00*
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	31.00-32.00
No. 1 busheling	*42.00-44.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	45.00-46.00
Punchings & plate scrap	46.00-47.00

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	*34.00-35.00*
Clean auto cast	*51.00-52.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
R.R. malleable	*52.00-53.00*
Rails, 2 ft and under	*57.00-58.00*
Rails, 18 in. and under	*58.00-59.00*
Angles, splice bars	53.00-54.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	*275.00-285.00*
18-8 turnings	*145.00-155.00*
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*40.00*
No. 2 bundles	*29.00*
No. 1 busheling	*40.00*
Machine shop turnings	*22.50*
Mixed borings, turnings	*22.50*
Short shovel turnings	*25.50*
Punchings & plate scrap	*45.50*

Cast Iron Grades

Charging box cast	**32.00**
No. 1 cupola	**39.00**
Stove plate	**32.00**
Heavy breakable	**32.00**
Unstripped motor blocks	**22.00**
Clean auto cast	**42.00**
Malleable	**35.00**

BIRMINGHAM

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*36.00-37.00*
Cast iron borings	17.00-18.00
Short shovel turnings	*26.00-27.00*
Machine shop turnings	*23.00-24.00*
Electric furnace bundles	*37.00-38.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*47.50-48.00*
Stove plate	*44.50-45.50*
Bar crops and plate	*42.00-43.00*
Structural plate, 2 ft	*41.00-42.00*
Unstripped motor blocks	*36.00-37.00*
Charging box cast	*38.00-39.00*
No. 1 wheels	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	*53.00-54.00*
Rails, rerolling	53.00-54.00
Rails, random lengths	*49.00-50.00*
Angles, splice bars	*50.00-51.00*

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	46.00-47.00
No. 2 bundles	37.00-39.00
No. 1 busheling	46.00-47.00
Electric furnace bundles	47.50
Machine shop turnings	28.00-28.50
Mixed borings, turnings	27.00-28.00
Short shovel turnings	30.50-31.00
Structurals & plate	49.00
Heavy turnings	42.00
Couplers, springs, wheels	*51.00*
Rail crops, 2 ft & under	*58.00*

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Malleable	*57.00-58.00*
Heavy breakable cast	45.00-46.00
Drop broken machinery	*47.00-48.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	40.50-41.50
No. 2 heavy melting	37.00-38.00
No. 1 bundles	40.50-41.50
No. 2 bundles	31.00-32.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	22.00-23.00
Low phos. (structural & plate)	42.00

Cast Iron Grades

No. 1 cupola	*34.50*
Unstripped motor blocks	*25.00-26.00*
Heavy breakable	*38.00-39.00*

Stainless Steel

18-8 sheets, clips, solids	270.00-275.00
18-8 borings, turnings	135.00-140.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
Machine shop turnings	18.50-19.00
Mixed borings, turnings	21.50-22.00
Short shovel turnings	22.50-23.00
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*38.00-39.00*
Mixed borings, turnings	*28.00-29.00*
Machine shop turnings	*26.00-27.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Low phos.	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	34.00-35.00
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*40.00-41.00*
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	23.00-24.00
Short shovel turnings	29.00-30.00
Cast iron borings	23.00-24.50
Low phos., 18 in.	*46.00-4700*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	38.00-39.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	*57.00-58.00*
Rails, random lengths	*49.00-50.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.50
No. 2 heavy melting	34.00
No. 1 bundles	36.50
No. 2 bundles	29.50
Machine shop turnings	26.00
Short shovel turnings	27.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	*39.00*
Heavy breakable cast	36.00
Unstripped motor blocks	35.00
Brake shoes	36.00
Clean auto cast	46.00
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00*
Rails, 18 in. and under	*55.00*
Rails, random lengths	48.00
Rails, rerolling	*63.00*
Angles, splice bars	*50.50*

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	42.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	35.00
Heavy breakable cast	30.00
Unstripped motor blocks	29.00
No. 1 wheels	35.00
Stove plate (f.o.b. plant)	25.00
Brake shoes	28.00-29.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Machine shop turnings	10.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	**43.00-45.00**

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	32.00
No. 1 bundles	34.00
No. 2 bundles	29.00
No. 1 busheling	34.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Short shovel turnings	16.00
Cast iron borings	16.00
Cut structurals	36.00
Heavy turnings	14.00
Punchings & plate scrap	34.00

Cast Iron Grades

No. 1 cupola	42.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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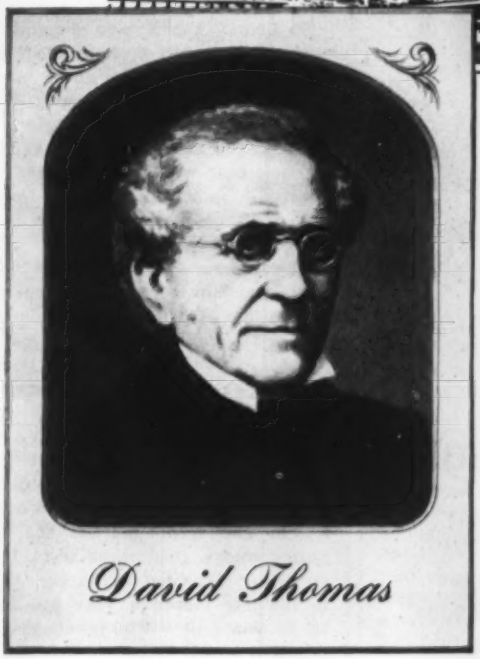

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(*Concluded from page* 171)

material: No. 1 heavy melting, to $44; No. 1 factory bundles, to $45. At the moment, it isn't clear if No. 1 dealer heavy melting will move up correspondingly. Other dealer items stand unchanged. In a small sale, No. 1 railroad heavy melting is up $2 a ton. Consumers appear to be buying scrap sparingly in their effort to minimize price advances.

Detroit — The undertone of the scrap market here is strong. Demand continues heavy. No. 1 heavy melting is quoted at $40; No. 2 heavy melting, $30.

St. Louis—A pickup in demand for railroad scrap has brought moderate price increases but no more offerings. Most grades were marked up $1 a week ago. Rerollers are in long demand and short supply. Charging box cast went up $3 under the impetus of stocking by large foundries. Otherwise, the cast iron market is lifeless.

Birmingham — Scrap prices generally went up last week on new mill purchasing. Open hearth grades advanced $4, and other items $2 and $3 per ton. The two principal buyers of steel grades entered the market for limited tonnages after holding back purchases for a month to avoid competing with export demand.

Los Angeles—The hottest weather in Los Angeles' history slowed activity in the scrap market the last couple weeks. September sales, however, are expected to exceed those in the like month a year ago by 5 to 10 per cent. Mill purchases are reported steady.

San Francisco — Prices on steel grades of scrap are holding at the recently advanced levels. Mill demand is steady. Active exports are lending strength to the market.

Seattle—The scrap market is firm at $35 and $31, respectively, for No. 1 and No. 2 heavy melting steel grades. Country shipments are heavier to tidewater, with domestic and foreign demand active. Local consumption is above that of a year ago.

Washington—Consumption of ferrous materials (scrap and pig iron) during July decreased 9 per cent from June, reports the Bureau of Mines.

Scrap available for consumption during the month totaled 5,421,000 gross tons, 10 per cent less than in June.

Stocks of ferrous scrap held by consumers totaled 6,369,000 gross tons during the month, off slightly from June. The 2,059,000 tons of pig iron held by consumers and suppliers showed an increase of 9 per cent over the preceding month.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6700 tons, arrival and wing buildings, Idlewild Airport, Long Island, N. Y., awarded by Port of New York Authority, to Harris Structural Steel Co., New York.

1865 tons, state bridge work, Chautauqua county, New York, through Johnson, Drake & Piper, to Ernst Construction Co., Buffalo.

1915 tons, state bridge work, Chautauqua county, New York, reported placed with American Bridge Division, U. S. Steel Corp., Pittsburgh.

1270 tons, laboratory extension, Bakelite Division, Union Carbide & Carbon Corp., Bound Brook, N. J., to the Bethlehem Steel Co., Bethlehem, Pa.

1215 tons, building, Federal Reserve Bank, Buffalo, through William I. Crow Construction Co., general contractor, to Buffalo Steel Co., Buffalo.

745 tons, lintels, Linden Houses, Brooklyn, N. Y., through S. S. Silberblatt Inc., general contractor, to Reasonable Iron Works, that city.

690 tons, printing plant, Watch Tower Bible Tract Society, Brooklyn, N. Y., to Dreier Structural Steel Co. Inc., Long Island City, N. Y. (This was erroneously reported in STEEL, Aug. 22 issue, as being placed with another company).

430 tons, New York City Transit Authority substation, 75th and 128th streets, New York, through Amdor Structures Inc., general contractor, to Ingalls Iron Works, Verona, Pa.

415 tons, building 65, Hoffman-LaRoche, through Wigton-Abbott, engineer, to Sabory & Glaser Inc., Bound Brook, N. J.

315 tons, tank tower, Johns-Manville Corp., Lomtac, Calif., to San Jose Steel Co. Inc.

255 tons, foundry, Bendix Aviation Corp., Teterboro, N. J., through J. L. Mucarelle, general contractor, to Bergen Iron & Engineering Co., Jersey City, N. J.

235 tons, state turnpike bridges, Lackawanna county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, Salesianum school and faculty building, Wilmington, Del., to Concrete Steel Supply Co., Atlantic City, N. J.

200 tons, repair to New York Central bridge, Terre Haute, Ind., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

190 tons, Kramer Lane School, Oyster Bay, N. Y., through De Fortunate, general contractor, to Sylvester Sternberg, Long Island fabricator.

150 tons, 6-story office building, Western

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Montana Building & Loan Association, Missoula, Mont., to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Few Construction Co.

145 tons, warehouse, Sears Roebuck & Co., Brooklyn, N. Y., through Sommer Bros., Construction Co., general contractor, to Jones & Laughlin Steel Corp., Pittsburgh.

100 tons, structurals and bars, dormitory, Norwich University, Northfield, Vt., to Vermont Structural Steel Co., Burlington, Vt., and Concrete Steel Co., New York.

STRUCTURAL STEEL PENDING

4630 tons, bridges, Greenwich-Killingly expressway, Milford and Norwalk, Conn.; bids postponed to Sept. 26, Hartford, Conn.

1600 tons, state bridge work, contract ET-55-8, Erie county, N. Y.; bids Sept. 22.

1200 tons, state highway bridges, Southeast expressway, Boston-Milton, Mass.; bids in.

1180 tons, New York City Transit Authority power plant addition, 74th street, New York, Lehigh Structural Steel Co., Allentown, Pa., low bidder.

1050 tons, state bridge work, contract ET-55-9, Chautauqua county, N. Y.; bids Sept. 22.

630 tons, state bridge work, contract ET-55-7, Chautauqua county, N. Y.; bids Sept. 22.

483 tons, gates and stoplogs, the Dalles dam; bids in to the U. S. Engineer, Portland, Oreg.

415 tons, wide flange beams, also 20 tons of channels, Navy General Stores Supply Office, Philadelphia; bids in.

350 tons, state highway bridges, Plymouth, Mass.; Central Construction Co., Lawrence, Mass., low on general contract.

240 tons, two-span continuous stringer bridge, Canton, Mass.; bids Sept. 20, Boston.

230 tons, industrial fund building No. 7, Wilkes-Barre, Pa.; bids closed Sept. 15.

205 tons, two-span continuous girder bridge, Wilbur Cross highway, Tolland, Conn.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, barracks and miscellaneous buildings, Marine Corps., Beaufort, N. C., to Conners Steel Co., Birmingham; J. A. Jones Construction Co., Charlotte, N. C., general contractor; structurals to Decatur Steel & Iron Co., Decatur, Ala.

500 tons, bars and structurals, two clinic buildings, East Louisiana State Hospital, East Jackson, La., to Jones & Laughlin Steel Corp., New Orleans, and City Steel Co., Jackson, Miss.; Wood Construction Co., Quitman, Miss., general contractor.

470 tons, building, Glatfelder Paper Mill, Spring Grove, Pa., to Brocker Co., York, Pa.

370 tons, Alaskan military installations, to Bethlehem Pacific Coast Steel Corp., Seattle.

300 tons, ordnance facilities, Elelson Air Base, Alaska, to Soule Steel Co., Seattle; Lytle & Green, general contractors.

300 tons, Providence, R. I., defense area facilities, Bristol-Coventry, R. I., to Igoe Bros. Inc., Newark, N. J.; the Ferber Co., Hackensack, N. J., general contractor.

155 tons, local church, and state highway projects, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1990 tons, state bridge work, Berks county, Pa.; bids Sept. 30; also required are approximately 1250 tons of structural steel.

800 tons, overpass structure, Greenwich-Killingly expressway, Tolland, Conn.; bids Sept. 26, Hartford, Conn.; also 590 tons, steel piles, and 2400 tons of fabricated structural steel.

585 tons, substructure, Norwalk river bridge and two-span girder bridge, Greenwich-Killingly expressway, Norwalk, Conn.; bids Sept. 26, Hartford, Conn.; also 1675 tons, steel piles, and 225 tons of fabricated structural steel.

450 tons, defense facilities, Cleveland; bids Oct. 4; Corps of Engineers, Pittsburgh.

400 tons, laboratory, Campbell Soup Co., Camden, N. J.; bids asked.

355 tons, bridge superstructure, Norwalk river, Greenwich-Killingly expressway, Norwalk, Conn.; bids Sept. 26, Hartford, Conn.; also 2030 tons of fabricated structural steel.

200 tons, Socony mobile laboratory, Wilmington, Del.

PLATES . . .

PLATES PLACED

1450 tons, seven tanks, Esso Standard Oil Refining Co., Philadelphia, to Hammond Iron Works, Warren, Pa.

900 tons, propane tanks, Pyrofax Gas Corp., division of Union Carbide & Carbon Corp., to ACF Industries Inc., New York.

350 tons, potline facilities, Kaiser Aluminum & Chemical Co., Tacoma, Wash., to unstated fabricator.

240 tons, tank, Cities Service Oil Co., Warners, N. J., to Chicago Bridge & Iron Co., Chicago.

180 tons, 100,000-cu-ft acetylene gasholder, Air Reduction Co. Inc., Calvert City, Ky., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

500 tons, five storage tanks, King Solomon, Alaska; bids to U. S. Engineer postponed from Sept. 16 to Sept. 23.

125 tons, jet fuel oil tank, Ardmore Airfield Base, Ardmore, Okla.; bids Sept. 21, Corps of Engineers, Tulsa, Okla.

PIPE . . .

STEEL PIPE PENDING

680 tons, pier, power house, St. Lawrence river project, Ontario, Can.; bids in.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, 46 diesel locomotive units, with ten 2250-hp road switchers going to Alco Products Inc., New York, and nine 4-unit 7000-hp freight locomotives to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

Virginian Railway, twelve 3300-hp electric locomotives with electronic tubes, to the Erie, Pa., plant of the General Electric Co.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 50 mechanical refrigerator cars, to own shops.

Atlanta & West Point & Western of Alabama, 100 boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Buffalo Creek Railroad, owned jointly by the Erie and Lehigh Valley, 1000 fifty-ton boxcars; 500 to the Pullman-Standard Car Mfg. Co., Chicago, and the remainder to ACF Industries Inc., New York.

Chicago & Eastern Illinois, 100 fifty-ton boxcars, to own shops.

Erie, 500 boxcars, to General American Transportation Corp., Chicago.

Missouri-Kansas-Texas, 75 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Missouri-Kansas-Texas, one rail diesel passenger car, to the Budd Co., Philadelphia.

New York, New Haven & Hartford, 500 fifty-ton roller bearing boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Soo Line, 30 seventy-ton covered hopper cars and 10 seventy-ton gondola cars, to own shops.

RAILROAD CARS PENDING

Alaska Railroad, 50 flat cars, 70-ton capacity; bids in to General Services, Seattle.

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Because costs are set largely in labor and burden, lost production is reflected directly in high unit cost. Old equipment is not the only cause. Failure to utilize the latest processing techniques may be keeping you from increasing production and lowering unit cost.

For example, consider the low-velocity, controlled-abrading Microhoning process which combines stock removal, geometric accuracy, size control and surface finish to increase *production* and *precision*. Inherent characteristics of Microhoning eliminate such downtime factors as tool sharpening, fixture and machine aligning.

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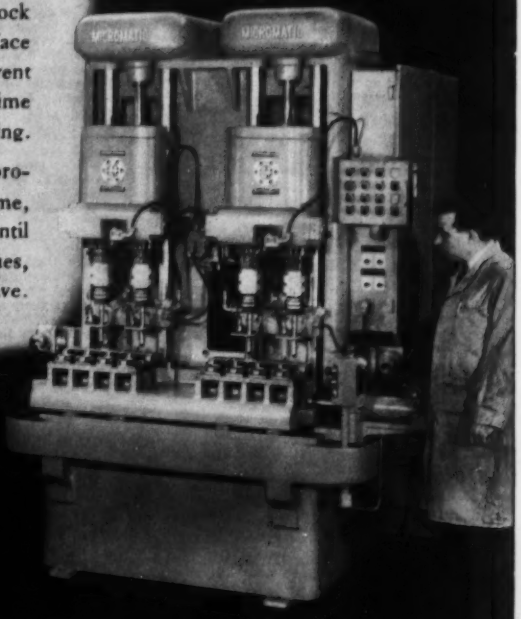

PART:
Connecting rod—wristpin and crankpin bores.

PROBLEM:
High unit cost; how to increase production without increasing labor or burden cost.

SOLUTION:
Microhoning—simplified processing of wristpin bore (eliminating 3 operations); gross production increased to 600 bores per hour, within all specified tolerances.

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Farval reduces lube time 80% on world's largest horizontal forging press at Tube Turns

FARVAL—
Studies in Centralized Lubrication
No. 174

NOT a bearing failure or a shutdown due to faulty lubrication in the year since this world's largest upsetter was put into service! That's because it was equipped with a Farval Centralized Lubrication System by the builder.

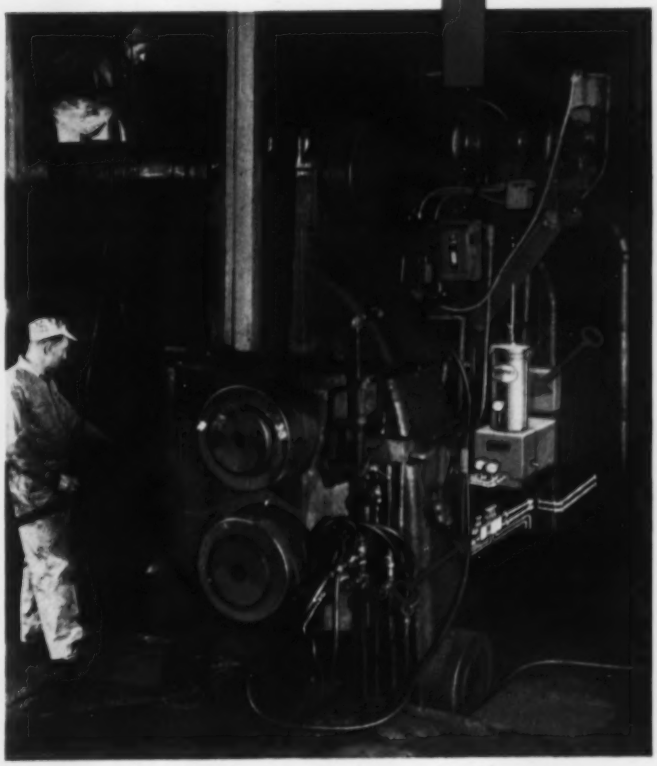
Farval was installed because of Tube Turns' previous good experience with systems on five other upsetters and two presses. They found that the number of man hours required for lubrication was reduced approximately 80%. Even more important is the freedom from work stoppages and bearing troubles assured by Farval. The Supervisor of Maintenance says, "When other machines of this type are secured, they too will be equipped with Farval Systems."

Farval is the Dualine system of centralized lubrication. It delivers clean oil or grease, exactly metered, to each bearing as often as desired, pumped under pressure. To lubricate a machine like this one, with 110 bearings, requires no labor and no downtime; it is done automatically and at regular intervals, while the machine is under full load.

It will pay you, too, to investigate Farval. Let us send a representative to discuss economical, efficient lubrication with you. Write for our Bulletin 26, which illustrates and describes the Farval line.

The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



10-inch horizontal upsetter in operation at Tube Turns Inc., Louisville, Ky. It forges components for military and commercial aircraft of advanced design. Note the Farval automatic pumping station on the right.

KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar central pumping station, dual lubricant lines and valve manifolds—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

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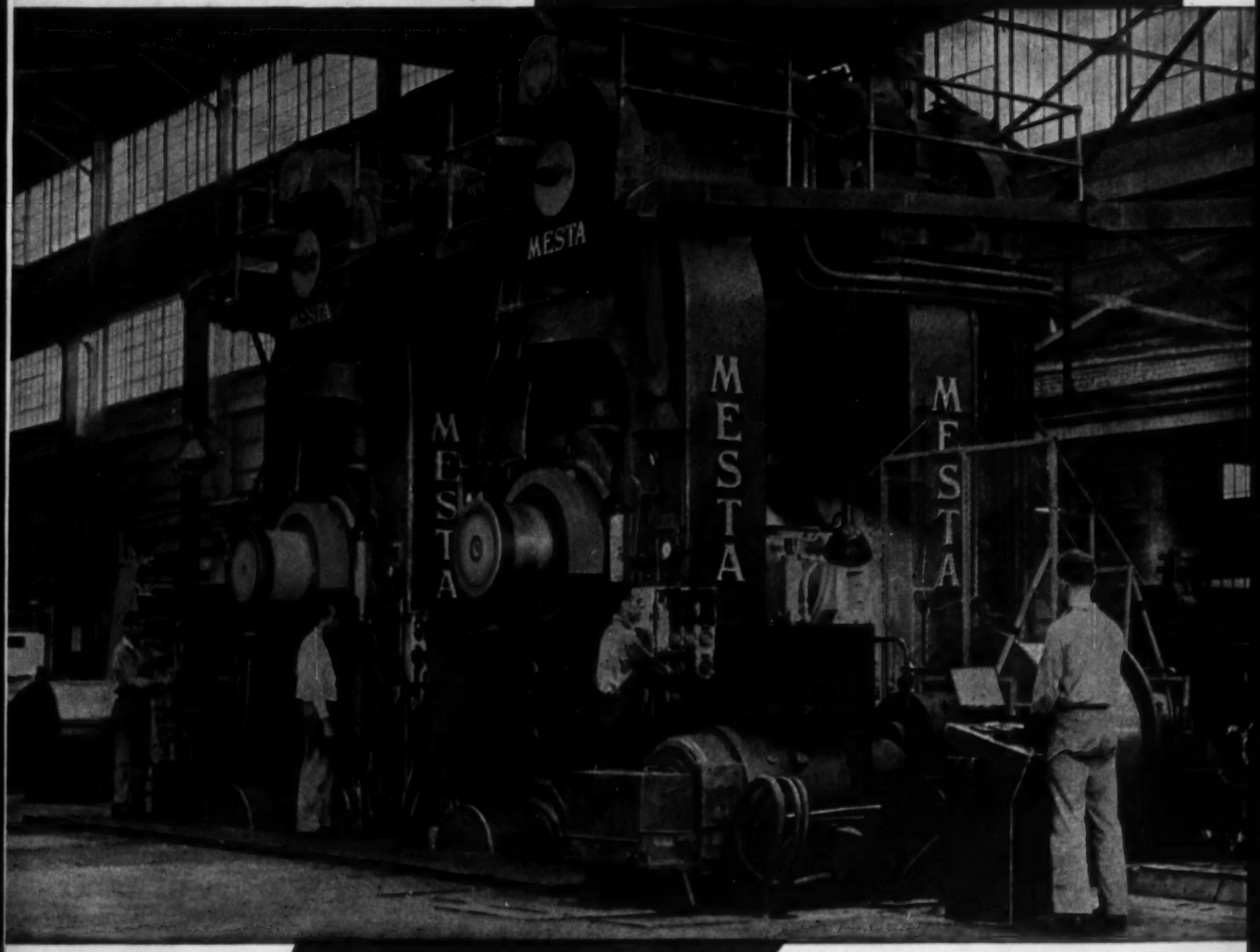

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